

# **NOTICE**

**All drawings located at the end of the document.**



# Characterization Report for the 903 Drum Storage Area, 903 Lip Area, and Americium Zone

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## TABLE OF CONTENTS

EXECUTIVE SUMMARY .....	E-1
1.0 INTRODUCTION .....	1
1.1 SITE BACKGROUND .....	1
1.2 ROCKY FLATS CLEANUP AGREEMENT .....	2
1.3 EXISTING DATA .....	5
1.3.1 Surface Soils .....	5
1.3.2 Subsurface Soils .....	5
1.3.3 Groundwater .....	6
1.4 SURFICIAL GEOLOGY .....	8
1.5 SITE CONCEPTUAL MODEL .....	9
1.6 PROJECT INVESTIGATION AREA .....	10
2.0 FIELD INVESTIGATION .....	15
2.1 OVERVIEW .....	15
2.2 SURFACE SOIL INVESTIGATION .....	15
2.2.1 HPGe Methodology .....	15
2.2.2 Double Sampling Correlation Technique .....	17
2.2.2.1 Alpha Spectroscopy/HPGe <sup>239/240</sup> Pu and <sup>241</sup> Am Correlations .....	24
2.2.2.2 Alpha Spectroscopy/HPGe <sup>235</sup> U and <sup>238</sup> U Correlations .....	29
2.2.3 FIDLER Surveys .....	29
2.3 SUBSURFACE SOIL INVESTIGATION .....	30
2.3.1 Radiological Investigation .....	30
2.3.2 VOC Investigation Boreholes .....	32
2.4 903 PAD ASPHALT SAMPLES .....	33
2.5 WORK CONTROLS .....	33
3.0 DATA QUALITY ASSESSMENT .....	48
3.1 VERIFICATION OF RESULTS .....	48

3.2	VALIDATION.....	49
3.3	PARCC PARAMETERS.....	50
3.3.1	Precision .....	50
3.3.2	Accuracy.....	56
3.3.3	Representativeness.....	60
3.3.4	Completeness.....	60
3.3.5	Comparability .....	63
3.3.6	Sensitivity .....	64
3.3.7	Summary.....	64
4.0	NATURE AND EXTENT OF CONTAMINATION .....	65
4.1	SOIL RADIOLOGICAL CONTAMINATION IN THE AMERICIUM ZONE.....	65
4.1.1	Comparison of HPGe Measurements to Tier I and Tier II RSALs .....	65
4.1.2	Spatial Distribution of Radiological Contamination in the Americium Zone.....	66
4.1.3	FIDLER Surveys .....	67
4.2	SOIL RADIOLOGICAL CONTAMINATION IN THE 903 PAD AND LIP AREA .....	68
4.2.1	Radionuclide Activities in Native Soils.....	69
4.2.1.1	Native 1 Surface Soil Contamination.....	69
4.2.1.2	Native 2 Subsurface Soil Contamination .....	70
4.2.1.3	Native 3 Subsurface Soil Contamination .....	70
4.2.2	Spatial Distribution of Contamination.....	70
4.2.2.1	Spatial Distribution of Radionuclides in the Native 1 Soil Horizon .....	71
4.2.2.2	Spatial Distribution of Radionuclides in the Native 2 Soil Horizon .....	71
4.2.2.3	Spatial Distribution of Radionuclides in the Native 3 Soil Horizon .....	72
4.2.3	Radionuclide Activities in 903 Pad Asphalt and 903 Pad Artificial Fill .....	73
4.2.3.1	Radionuclide Distribution in Asphalt .....	73
4.2.3.2	Radionuclide Distribution in Artificial Fill.....	74
4.3	SUBSURFACE SOIL VOC INVESTIGATION.....	75
5.0	CONTAMINATED MEDIA VOLUME ESTIMATES .....	97
5.1	903 PAD ASPHALT AND ARTIFICIAL FILL VOLUME ESTIMATES .....	97
5.2	TIER I RSAL EXCEEDANCE SOIL VOLUME ESTIMATES.....	98
5.3	TIER II RSAL EXCEEDANCE SOIL VOLUME ESTIMATES .....	98
5.4	SSAL EXCEEDANCE SOIL VOLUME ESTIMATES .....	100
5.4.1	Tier I SSAL Exceedance Soil Volume Estimates.....	100

5.4.2	Tier II SSAL Exceedance Soil Volume Estimates .....	101
5.5	RSAL AND SSAL EXCEEDANCE SOIL VOLUME ESTIMATES .....	101
5.6	SSAL EXCEEDANCE SOIL VOLUME ESTIMATES (Non-Radiological Contaminated) .....	101
5.7	SUMMARY OF MEDIA VOLUME ESTIMATES .....	102
6.0	REFERENCES .....	107
Appendix A – Boring Logs.....		A-1
Appendix B – Precision (DER and RPD) Calculations .....		B-1
Appendix C – 903 Pad <i>In-Situ</i> Models and Uncertainties .....		C-1
Appendix D – Summary Statistics.....		D-1
Appendix E – Electronic Copy of Analytical Database, Electronic Copy of RFCA Tier I and Tier II RSAL Calculation Results.....		E-1

## FIGURES

1-1	Study Area Location Map.....	11
1-2	1994 HPGe Survey Data for Am-241 in Investigation Area .....	12
1-3	OU2 Phase II RFI/RI Surface Soil Sampling Plots Study Area .....	13
1-4	Investigation Area Location Map .....	14
2-1	HPGe Measurement Location Map .....	35
2-2	Americium-241 Activities in Soil – Gamma Spectroscopy vs. Alpha Spectroscopy Correlation .....	36
2-3	HPGe 15-Point Surface Soil Sampling Pattern.....	37
2-4	Alpha Spectroscopy vs. HPGe Gamma Spectroscopy – Americium-241 Correlation .....	38
2-5	Alpha Spectroscopy vs. HPGe Gamma Spectroscopy – Americium-241 vs. Plutonium 239/40 Correlation .....	39
2-6	RSAL Exceedances in Surface Soil Using Direct HPGe Results-HPGe Survey.....	40
2-7	RSAL Exceedances in Surface Soil Using Best Fit Line-HPGe Survey .....	41
2-8	RSAL Exceedances in Surface Soil Using 95% UCL-HPGe Survey.....	42
2-9	HPGe Surface Soil Samples - Plutonium-239/240 vs. Americium-241 Correlation (Pu/Am Activity Ratio).....	43
2-10	Alpha Spectroscopy vs. HPGe Gamma Spectroscopy – Uranium-235 Correlation .....	44
2-11	Alpha Spectroscopy vs. HPGe Gamma Spectroscopy – Uranium-238 Correlation .....	45
2-12	Radiological Subsurface Soil Sampling Locations – 903 Pad and 903 Lip Area .....	46
2-13	VOC Investigation Borehole Location Map .....	47
4-1	Range of Radionuclide Activities in Surface Soil-HPGe Survey .....	78
4-2	RSAL Exceedances in Surface Soil-HPGe Survey.....	79
4-3	Distribution of Am-241 in Surface Soil- HPGe Survey .....	80

4-4	Distribution of Pu-239/240 in Surface Soil-HPGe Survey .....	81
4-5	Range of Radionuclide Activities in Native 1, Native 2, and Native 3 Soil Horizons .....	82
4-6	RSAL Exceedances in Native 1 Soil Horizon .....	83
4-7	Distribution of Am-241 in Native 1 Soil Horizon .....	84
4-8	Distribution of Pu-239/240 in Native 1 Soil Horizon .....	85
4-9	RSAL Exceedances in Native 2 Soil Horizon .....	86
4-10	Distribution of Am-241 in Native 2 Soil Horizon .....	87
4-11	Distribution of Pu-239/240 in Native 2 Soil Horizon .....	88
4-12	RSAL Exceedances in Native 3 Soil Horizon .....	89
4-13	Distribution of Am-241 in Native 3 Soil Horizon .....	90
4-14	Distribution of Pu-239/240 in Native 3 Soil Horizon .....	91
4-15	Radionuclide Distribution in Asphalt .....	92
4-16	RSAL Exceedances in Artificial Fill Beneath 903 Pad .....	93
4-17	Range of Radionuclide Activities in Asphalt and Artificial Fill .....	94
4-18	VOC Distribution in Subsurface Soil .....	95
4-19	Range of VOC Concentrations in Subsurface Soil .....	96
5-1	Composite Map of Tier I RSAL Exceedances .....	104
5-2	Composite Map of Tier II RSAL Exceedances .....	105
5-3	Composite Map of Proposed Tier I and II SSAL Exceedances .....	106

## TABLES

1-1	RFCA Tier I and II Radionuclide Soil Action Levels .....	4
1-2	RFCA ALF Tier I Subsurface Soil Action Levels - VOCs .....	4
1-3	Comparison of Pure Single Phase Aqueous Solubility with VOC Concentrations in Groundwater .....	8
2-1	Laboratory Gamma Spectroscopy Results vs. Laboratory Alpha Spectroscopy Results – <sup>241</sup> Am .....	17
2-2	HPGe <sup>241</sup> Am Results at Double Sample Locations .....	18
2-3	Surface Soil Samples, Weighted Average Calculations .....	19
2-4	Alpha Spectroscopy Results for <sup>241</sup> Am at Double Sampling Locations .....	20
2-5	Alpha Spectroscopy Results for <sup>239/240</sup> Pu at Double Sampling Locations .....	22
2-6	OU2 RFI/RI Trench Soil Sample Results .....	26
2-7	Alpha Spectroscopy Results of Surface Soil Samples – HPGe Double Sampling Locations .....	28
2-8	Alpha Spectroscopy Results of Surface Soil Samples – Actinide Migration Evaluation Project .....	28
3-1	Sample Types & Data Quality Objectives .....	48
3-2	Surface Soil Duplicate Assessment – Gamma Spectroscopy Results .....	52
3-3	Surface Soil Duplicate Assessment – Alpha Spectroscopy Results .....	53
3-4	Radionuclide Subsurface Soil Replicate Assessment – Alpha Spectroscopy Results .....	53
3-5	Duplicate Sample Results – Volatile Organic Compound Analysis .....	55
3-6	Comparison of Detection Limits – In Situ Gamma Spectroscopy .....	56
3-7	Comparison of Detection Limits – Alpha Spectroscopy .....	57
3-8	Comparison of Detection Limits – Volatile Organic Compound Analysis .....	58
3-9	Quality Control Sample Summary .....	59
3-10	Planned vs. Actual Sample Comparison .....	61

3-11	QC Sample Type, Quantity.....	62
4-1	Frequency of RFCA Tier I and Tier II RSAL Exceedances – HPGe Survey Results .....	66
4-2	Frequency of RFCA Tier I and Tier II RSAL Exceedances – Native Soil Results .....	69
4-3	Descriptive Summary Statistics for 903 Pad Asphalt .....	74
4-4	Descriptive Summary Statistics for 903 Pad Artificial Fill .....	75
4-5	Frequency of VOC of VOC SSAL Exceedances in Subsurface Soil.....	76
5-1	Summary of 903 Pad Asphalt and Artificial Fill Volumes.....	97
5-2	Summary of Radiologically Contaminated Soil Volumes – Tier I RSAL Exceedances .....	98
5-3	Summary of Radiologically Contaminated Soil Volumes – Tier II RSAL Exceedances.....	99
5-4	Summary of Radiologically Contaminated Soil Volumes – SSAL Exceedances.....	100
5-5	Volumes of Asphalt, Artificial Fill, and Soil Exceeding Tier I RSALs and SSALs, .....	102
5-6	Volumes of Asphalt, Artificial Fill, and Soil Exceeding Tier II RSALs and SSALs .....	103

## ACRONYMS

ALF	Action Levels & Standards Framework for Surface Water, Groundwater & Soil
Am	Americium
bgs	below ground surface
C	Carbon
CCL <sub>4</sub>	Carbon Tetrachloride
CDH	Colorado Department of Health
CDPHE	Colorado Department of Health and Environment
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
cm	centimeter
cpm	counts per minute
COC	Contaminant of Concern
CRQL	Contract Required Quantitation Limit
1,2-DCE	1,2-Cis-Dichloroethylene
DER	Duplicate Error Ratio
DNAPL	Dense Nonaqueous Phase Liquid
DOE	U. S. Department of Energy
DOT	Department of Transportation
DQA	Data Quality Assessment
DQO	Data Quality Objective
EPA	Environmental Protection Agency
Eq	Equation
FIDLER	Field Instrument for the Detection of Low Energy Radiation
FOV	Field of View
g/cc	density (gram/cubic centimeter)
HPGe	High Purity Germanium Detector
IHSS	Individual Hazardous Substance Site
IM/IRA	Interim Measures/Interim Remedial Action
ISOCs	In Situ Object Counting System
kg	kilogram
K-H	Kaiser-Hill Company, L.L.C.
m	meter
MeV	Value of Energy
mg/L	micrograms per liter
MS/MSD	Matrix Spike/Matrix Spike Duplicate
OU	Operable Unit
PARCC	Precision, Accuracy, Representativeness, Completeness, & Comparability
PCE	Tetrachloroethene
pCi/g	picocuries per gram
Pu	Plutonium
QA	Quality Assurance
QAPD	Quality Assurance Program Description
RCRA	Resource Conservation and Recovery Act
RFCA	Rocky Flats Cleanup Agreement
RFETS	Rocky Flats Environmental Technology Site
RFFO	Rocky Flats Field Office
RFI/RI	RCRA Facility Investigation/Remedial Investigation

RIN	Routine Identification Number
RMRS	Rocky Mountain Remediation Services, L.L.C.
RPD	Relative Percent Difference
RSAL	Radionuclide Soil Action Level
RWP	Radiation Work Permit
SAP	Sampling and Analysis Plan
SOR	Sum of Ratios
TCE	Trichloroethene
TMU	Total Measurement Uncertainty
TPU	Total Propagated Uncertainty
U	Uranium
UCL	Upper Confidence Limit
ug/kg	micrograms/kilogram
ug/L	microgram per liter
V&V	Verification/Validation
VOC	Volatile Organic Compound
WAC	Waste Acceptance Criteria

## EXECUTIVE SUMMARY

Investigation of soil contamination at the 903 Drum Storage Area (903 Pad), 903 Lip Area (Lip Area), and Americium Zone was performed to provide characterization data for subsequent evaluation of remedial alternatives for site cleanup. Historically, drums which were stored at the 903 Pad between 1958 and 1967 leaked hydraulic fluids and lathe coolant containing plutonium and depleted uranium. This release contaminated surface and subsurface soil with radionuclides and volatile organic compounds (VOCs). The VOCs have migrated into the shallow groundwater system beneath the 903 Pad.

The primary purpose of this investigation was to estimate the volume of contaminated soil above the Rocky Flats Cleanup Agreement (RFCA) Tier I Radionuclide Soil Action Levels (RSALs) and Subsurface Soil Action Levels (SSALs). Another objective of the investigation was to characterize surface soil to 10 pCi/g americium-241 ( $^{241}\text{Am}$ ) using gamma spectroscopy field instrumentation. This characterization would allow for identification of surface soils exceeding Tier II RSALs. Remedial alternatives will be evaluated in the Interim Measure/Interim Remedial Action (IM/IRA) Decision Document based on these volume estimates.

Delineation of radiologically-contaminated soil in the Americium Zone was performed *insitu* using gamma-ray spectroscopy methods, which employ a high purity germanium detector (HPGe). The HPGe instrument was used to obtain 1110 contiguous gamma ray measurements with a circular field of view of 10 meters in diameter within the investigation area. Given this coverage, nearly the entire Americium Zone within the investigation area was surveyed for radionuclides.

The HPGe measurement results were correlated with alpha spectroscopy measurements of radionuclides in eight co-located surface soil samples. The resulting best-fit regression model was used to standardize each HPGe  $^{241}\text{Am}$  measurement to a laboratory-derived  $^{241}\text{Am}$  and plutonium-239/240 ( $^{239/240}\text{Pu}$ ) alpha spectroscopy measurement. The correlation results for  $^{241}\text{Am}$  and  $^{239/240}\text{Pu}$  were input into the Tier I and II RSAL sum of ratios equations to determine HPGe measurements locations exceeding the respective action levels.

Based on the standardized HPGe results, surface soil at approximately 37% of the HPGe measurement locations within the Americium Zone has radionuclides exceeding the Tier II RSALs. HPGe results that exceed Tier I RSAL are isolated at a cluster of three locations near the northwest corner of the Americium Zone and at one location in the south central portion of the Lip Area. The Tier I and Tier II RSAL exceedances are a result of elevated activities of  $^{239/240}\text{Pu}$  and  $^{241}\text{Am}$ . Within the Americium Zone,  $^{239/240}\text{Pu}$  activities ranged from 6.32 pCi/g to 938.42 pCi/g and  $^{241}\text{Am}$  activities ranged from 4.91 pCi/g to 149.22 pCi/g.

Contamination of surface and subsurface soils at the 903 Pad and Lip Area was delineated with data obtained from borings at evenly spaced grid nodes. Radiological samples from 79 boring locations were analyzed for  $^{241}\text{Am}$ ,  $^{239/240}\text{Pu}$ , uranium-233/234 ( $^{233/234}\text{U}$ ), uranium-235 ( $^{235}\text{U}$ ), and uranium-238 ( $^{238}\text{U}$ ) using alpha spectroscopy. VOC samples were collected from 17 boring locations and were analyzed for VOC contaminants of concern which included carbon tetrachloride ( $\text{CCL}_4$ ), chloroform, cis-1,2-dichloroethene (1,2-DCE), methylene chloride, tetrachloroethene (PCE), and trichloroethene (TCE).



Based on the data obtained from borings in the 903 Pad and Lip Area, most of the surface soil (0 to 6 inches) is contaminated above Tier I and Tier II RSALs.  $^{239/240}\text{Pu}$  and  $^{241}\text{Am}$  activities within the 903 Pad and Lip Area ranged from 0.82 pCi/g to 152,260 pCi/g and 0.15 pCi/g to 31,670 pCi/g, respectively. Radiological contamination was also detected in the subsurface soil at depths of 6 to 12 inches and 12 to 18 inches within the 903 Pad and Lip Area; however,  $^{239/240}\text{Pu}$  and  $^{241}\text{Am}$  activities decreased by orders of magnitude at progressively deeper soil horizons.

Artificial fill at the 903 Pad is contaminated above the RFCA Tier II RSALs at one location (Boring 91898). Soil at this boring has elevated levels of  $^{241}\text{Am}$  (126 pCi/g) and  $^{239/240}\text{Pu}$  (558 pCi/g). Asphalt samples from the 903 Pad were also collected for waste characterization profiling but were not compared to RFCA Tier I and Tier II RSALs.

Contaminated soil volumes are based on the areas and depths of Tier I and Tier II RSAL exceedances. The total volume of contaminated soil exceeding Tier I RSALs is 2,235 m<sup>3</sup> (2,924 yds<sup>3</sup>). The total volume of soil exceeding Tier II RSALs is estimated at 11,287 m<sup>3</sup> (14,763 yds<sup>3</sup>). Relative to Tier II RSAL exceedances, the amount of radiologically-contaminated soil at the 903 Pad is 1,889 m<sup>3</sup> (2,471 yds<sup>3</sup>); in the Lip Area is 4,027 m<sup>3</sup> (5,267 yds<sup>3</sup>); and in the Americium Zone is 5,371 m<sup>3</sup> (7,025 yds<sup>3</sup>).

No VOCs were detected in subsurface soil above the current SSALs within the 903 Pad and Lip Area. However, PCE, TCE and 1,2-DCE exceeded proposed Tier I and Tier II SSALs in several borings near well 08891. The total volumes of contaminated soil above proposed Tier I and Tier II SSALs are 558 yds<sup>3</sup> and 3,566 yds<sup>3</sup>, respectively. In addition, 138 yds<sup>3</sup> of contaminated soil containing elevated levels of both radionuclides and VOCs are also present.

## 1.0 INTRODUCTION

This report summarizes data collected to determine the location, area, and volume of soil potentially requiring evaluation, management, or remedial action at Individual Hazardous Substance Site (IHSS) 112 - 903 Drum Storage Area (903 Pad), IHSS 155 - 903 Lip Area (Lip Area) and Americium Zone, located at the Rocky Flats Environmental Technology Site (RFETS). Figure 1-1 provides the locations of the IHSSs and the Americium Zone. Remedial alternatives will be evaluated in the Interim Measures/Interim Remedial Action (IM/IRA) Decision Document based on these volume estimates.

Previous investigations have been conducted in these areas to evaluate the extent of contamination, and the data collected have been reported in the Operable Unit (OU) No. 2 Phase II Resource Conservation and Recovery Act (RCRA) Facility Investigation/ Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) Remedial Investigation (RFI/RI) Report (DOE, 1995). However, data from these earlier investigations do not provide the resolution necessary to accurately quantify the volume of soils that may require evaluation, management, or remedial action. Furthermore, with respect to VOC contaminated soils, the historical data do not support the presence of a separate phase dense non-aqueous phase liquid (DNAPL) at the 903 Pad, a model convincingly supported by groundwater data collected at this IHSS. Accordingly, the data reported herein were collected to fill these data gaps.

## 1.1 SITE BACKGROUND

Waste releases at the 903 Pad (IHSS 112) are considered the primary source of radiological contamination in the surficial soil in this part of the RFETS. Drums that contained hydraulic fluids and lathe coolant contaminated with plutonium and uranium were stored at this location from the Summer of 1958 to January 1967. Approximately three fourths of the drums contained liquids contaminated with plutonium while most of the remaining drums contained liquids contaminated with uranium. Of the drums containing plutonium, the liquid was primarily lathe coolant and carbon tetrachloride in varying proportions. Also stored in the drums were vacuum pump oils, trichloroethene (TCE), tetrachloroethene (PCE), silicone oils, and acetone still bottoms (DOE, 1995).

Leaking drums were noted in 1964 during routine handling operations. The contents of the leaking drums were transferred to new drums, and the area was fenced to restrict access. When cleanup operations began in 1967, a total of 5,237 drums were at the drum storage site. Approximately 420 drums leaked to some degree. Of these, an estimated 50 drums leaked their entire contents. The total amount of leaked material was estimated at around 5,000 gallons of contaminated liquid containing approximately 86 grams of plutonium (DOE, 1995).

From 1968 through 1970, some of the radiologically-contaminated material was removed from the 903 Pad and Lip Area, some of the surrounding Lip Area was regraded, and much of the area was covered by an imported base coarse material. An asphalt cap was placed over the most contaminated area resulting in the 903 Pad. However, during drum removal and cleanup activities, wind and rain (stormwater erosion) spread plutonium-contaminated soils to the east and southeast from the 903 Pad area resulting in IHSS 155 (903 Lip Area). Several limited excavations have removed some of the plutonium-contaminated soils from the Lip Area (DOE, 1995; Barker, 1982; and RMRS, 1997a). However, results from the OU2 Phase II RFI/RI sampling and analysis and this investigation confirm that radiologically-contaminated soils remain.

Surface soils to the east and southeast of the Lip Area also exhibit elevated plutonium-239/240 ( $^{239/240}\text{Pu}$ ) and americium-241 ( $^{241}\text{Am}$ ) activities. This contamination is primarily attributed to wind dispersion from the 903 Pad with potential contributions from historical fires, stack effluent, and stormwater related surface soil erosion. Areas exhibiting elevated  $^{239/240}\text{Pu}$  and  $^{241}\text{Am}$  activities east and southeast of the Lip Area are known as the Americium Zone.

## 1.2 ROCKY FLATS CLEANUP AGREEMENT

The Rocky Flats Cleanup Agreement (RFCA) is a legally binding agreement between the Department of Energy (DOE), the Environmental Protection Agency (EPA) and the Colorado Department of Public Health and Environment (CDPHE) to accomplish the required cleanup of radioactive and other hazardous substance contamination at the RFETS. Action levels and cleanup levels for interim remedial actions have been established for surface water, ground water, and soils and are presented in Attachment 5 of RFCA; "Action Levels and Standards Framework

for Surface Water, Ground Water, and Soils (ALF)" (K-H, 1999a). Surface soil is defined in the ALF as shallow soil to a depth of 6 inches (in) (15 cm). Subsurface soil is defined in ALF as soil deeper than 6 in (15 cm). Radionuclide Soil Action Levels (RSALs) for an open space future use scenario are the same for surface soils and subsurface soils.

Revisions to the Subsurface Soil Action Levels (SSALs) have been proposed which has resulted in revised Tier I action levels and the inclusion of new Tier II action levels for organic compounds. For this site characterization, contaminant concentrations in surface and subsurface soils have been compared to both Tier I and II RSALs, current Tier I SSALs, and proposed Tier I and Tier II SSALs (Kaiser-Hill, 1999a) in order to assist in the development of the best management strategy for site cleanup. In addition, an independent review of the soil action levels is currently being conducted by the Rocky Flats Soil Action Level Oversight Panel. Based on this independent review and the results from soil erosion modeling being performed by the Actinide Migration Evaluation Panel additional revisions to the soil action levels may be proposed in the future.

The parameters of interest include the activity/concentrations of the following radionuclides/compounds:

- Plutonium-239 /240 ( $^{239/240}\text{Pu}$ );
- Americium-241 ( $^{241}\text{Am}$ );
- Uranium-234 ( $^{234}\text{U}$ );
- Uranium-235 ( $^{235}\text{U}$ );
- Uranium-238 ( $^{238}\text{U}$ ); and
- VOCs (subsurface soils only).

Metals, semivolatile organic compounds, pesticides, and polychlorinated biphenyls were eliminated as potential contaminants of concern based on data evaluation from previous investigations (DOE, 1995).

**Radionuclides** - Table 1-1 provides the Tier I and Tier II RSALs for an open space future use exposure scenario.

**Table 1-1 RFCA Tier I and II Radionuclide Soil Action Levels - Surface and Subsurface Soils**

RADIONUCLIDE	TIER I RSAL (pCi/g)	TIER II RSAL (pCi/g)
<sup>241</sup> Am	215	38
<sup>239/240</sup> Pu	1429	252
<sup>234</sup> U	1738	307
<sup>235</sup> U	135	24
<sup>238</sup> U	586	103

If a mixture of radionuclide contaminants a, b, c are present in the soil with activities  $a_a$ ,  $a_b$ , and  $a_c$ , and if the applicable RSALs, are  $A_a$ ,  $A_b$ , and  $A_c$  respectively, then the activity in the soil shall be considered as exceeding the RSALs if the sum of ratios (SOR) is greater than 1, i.e.,

$$\text{Sum of Ratios (SORs)} = \frac{a_a}{A_a} + \frac{a_b}{A_b} + \frac{a_c}{A_c} > 1 \quad (\text{Equation 1-1})$$

**Volatile Organic Compounds** - Table 1-2 provides the current Tier I SSALs and the proposed Tier I and Tier II SSALs for VOC contaminants of concern in soils at the 903 Pad.

**Table 1-2 Subsurface Soil Action Levels - VOCs**

COMPOUND	Current TIER I SSAL (mg/kg)	Proposed TIER I SSAL (mg/kg)	Proposed TIER II SSAL (mg/kg)
Carbon Tetrachloride	11.00	3.56	0.0356
Chloroform	152.00	21.4	0.214
1,2,-Dichloroethene (Total)	9.51	14.0	0.14
Methylene Chloride	5.77	0.578	0.00578
Tetrachloroethene	11.5	3.15	0.0315
Trichloroethene	9.27	3.28	0.0328

### 1.3 EXISTING DATA

Numerous investigations to assess the extent of contamination at the 903 Pad, Lip Area, and Americium Zone have been conducted. These investigations are briefly described below.

#### 1.3.1 Surface Soils

*High Purity Germanium (HPGe) Surveys* - HPGe surveys conducted in 1990 (EG&G, 1991) and 1994 (DOE, 1995; RMRS, 1997b) provide useful information on the activity of  $^{241}\text{Am}$  in surface soils over the Americium Zone study area. These data were collected on a 150-foot grid to accommodate the HPGe detector's field of view (FOV) of 150 feet in diameter (17,671 ft<sup>2</sup>) (Figure 1-2). Surveys were not conducted over the 903 Pad and Lip Area and soil samples were not collected to supplement the surveys. The results from these surveys were utilized to define the boundaries of this characterization's investigation area.

*Surface Soil Radiological Data* - Surface soil samples were collected in support of the OU2 Phase II RFI/RI (DOE, 1995). As detailed in the RFI/RI, samples were collected utilizing two sampling methods; the Colorado Department of Health (CDH) sampling method and the Rocky Flats (RF) sampling method. Surface soil sample results were compared with Tier I RSALs. The results of the comparison indicated that samples collected from five 2.5-acre plots exceed the Tier I RSALs. These plots include two 2.5-acre plots (Plots 28 and 34) sampled using the CDH sampling method and three 2.5-acre plots (Plots 29, 36, and 46) sampled using the RF method (Figure 1-3).

#### 1.3.2 Subsurface Soils

*Subsurface Soil Radiological Data* - Three data sources were evaluated to determine the depth of radiological contamination within the study area: 1) RFI/RI borehole data (DOE, 1995); 2) RFI/RI soil profile pits (DOE, 1995); and 3) samples collected in support of a 1980 soil decontamination project (Rutherford, 1981). Results from the RFI/RI borehole samples were compared to RSALs and revealed that no samples exceed the Tier I RSALs. However, samples collected from soil profile pit TR08 exceeded Tier I RSALs to a depth of 27 centimeters (cm) (10.6 in). Soil profile pits were sampled at 3 cm (1.2 in) intervals to a total depth of 1 meter (m)

(3.28 feet). Samples collected at soil profile pit TR06, located adjacent to pit TR08, were not analyzed because activities exceeded the DOT shipping requirements. It is assumed that radiochemical results from pit TR06 would also exceed Tier I RSALs, if analyzed.

Soil samples collected beneath the 903 Pad in support of the 1980 soil decontamination project exceeded Tier I RSALs to a depth of 66 cm (26-in) (RMRS, 1997b). This depth exceeds the thickness of the asphalt pad and the depth of imported base coarse material and indicates radiological contamination of natural undisturbed soils at the 903 Pad. However, no RFI/RI soil borings detected radiological contamination in excess of Tier I RSALs. As a result, a discrepancy with the depth of radiological contamination between these investigations exists.

*Subsurface Soil VOC Data* - Three sources of data were evaluated to determine the nature and extent of contamination at the 903 Pad: 1) RFI/RI borehole data (DOE, 1995); 2) IM/IRA soil gas survey results (DOE, 1994); and 3) groundwater monitoring well data.

Borehole sample results from the RFI/RI were compared with current Tier I SSALs revealed that no samples exceeded the current Tier I SSALs for organic contaminants. The soil gas survey indicated that the highest VOC concentrations were located immediately south of the southeast corner of the 903 Pad. Tetrachloroethene was detected at 27,000 micrograms per liter (ug/L) at a depth of 5 feet. However, at adjacent soil gas locations and boreholes, tetrachloroethene is either not detected or detected at very low concentrations. Soil gas concentrations for the remaining portion of the 903 Pad ranged from 0-500 ug/L with the highest concentrations around and north of monitoring well 08891 (Figure 1-4).

### 1.3.3 Groundwater

A VOC-contaminated groundwater plume extends from the 903 Pad area to the east. The highest concentrations are found in groundwater samples collected from wells 06691 and 08891, which are located on the asphalt portion of the 903 Pad. Concentrations of contaminants in groundwater decrease rapidly moving eastward from the 903 Pad area. The primary groundwater contaminant in well 06691 is carbon tetrachloride with concentrations ranging from 51 to 100,000 ug/L. Methylene chloride (150 to 29,000 ug/L) and chloroform (92 to 46,000 ug/L) are also observed.

Groundwater sample results for well 08891 indicate the primary contaminant as PCE at concentrations ranging from 470 to 27,000 ug/L, along with carbon tetrachloride (290 to 17,000 ug/L), cis-1,2,dichloroethene (94 to 2,900 ug/L) and TCE (210 to 4,600 ug/L). The next highest concentration of carbon tetrachloride in groundwater is found in samples collected from well 13191, which is located west of the well 06691 and off the western edge of the 903 Pad. At this location, observed carbon tetrachloride levels ranged from 122 to 4,800 ug/L.

Concentrations of VOCs in groundwater decrease rapidly eastward from the 903 Pad area (DOE, 1995). For example, during the June 1998 groundwater sampling, well 06991 had 210 ug/L PCE and well 1587 had 880 ug/L PCE which are two orders of magnitude less than the concentration observed in well 08891 with 27,000 ug/L PCE (Figure 1-4).

Because of the complex nature of DNAPL transport and fate, DNAPL may often be undetected by direct methods leading to incomplete site assessments and inadequate remedial designs (EPA, 1992). A guide for estimating the potential for a DNAPL source at a site includes assessing if concentrations of DNAPL-related chemicals in groundwater are greater than 1% of the pure (single) phase solubility of the compound (EPA, 1992).

Table 1-3 provides a comparison of the pure single phase aqueous solubility and concentrations of DNAPL-compounds detected in groundwater at the 903 Pad (wells 06691 and 08891) from a June 1998 sampling event of monitoring wells 06691 and 08891. The comparison indicates that PCE and carbon tetrachloride have been detected in groundwater samples at 13.5% and 10.7% of their aqueous solubilities, respectively. These results and the known historical releases at the 903 Pad indicate there is a potential for pure phase organic contaminants in subsurface soils beneath the 903 Pad.



**TABLE 1-3 Comparison of Pure Single Phase Aqueous Solubilities with  
VOC Concentrations in Groundwater**

Compound	Pure Single Phase Aqueous Solubility at 25°C <sup>1</sup> (mg/l)	Concentration Detected in Groundwater June 1998 (mg/l)	Ratio Groundwater Concentration/ Aqueous Solubility (%)
Carbon Tetrachloride	793	85.0	10.7
Chloroform	7,920	4.4	0.1
cis-1,2,dichloroethene	3,500	1.3	0.04
Methylene Chloride	13,000	29.0	2.2
PCE	200	27.0	13.5
TCE	1,100	1.3	0.12

<sup>1</sup>EPA, 1996. Soil Screening Guidance: Technical Background Document

#### 1.4 SURFICIAL GEOLOGY

The surficial geology in the study area consists of Quaternary alluvium, colluvium and slump deposits along with artificial fill, soil and debris deposits, and disturbed soil. The surficial deposits overlie bedrock which consists of weathered claystone and minor bedrock sandstones of the Cretaceous Arapahoe and Laramie Formations. Surficial deposits consist of sandy clay and clayey gravel. Soil developed over the alluvium is rocky and sandy in contrast to the clayey soils developed over the claystone bedrock.

For this investigation, the surface and subsurface soils were subdivided into six soil horizons: (1) the Native 1 soil horizon consists of natural soils from 0 to 6 inches (surface soils); (2) the Native 2 soil horizon designates subsurface soils from 6 inches to 1 foot; (3) the Native 3 soil horizon designates subsurface soil from 1 to 1.5 feet; (4) the Native 4 soil horizon designates subsurface soil from 1.5 to 2.0 feet; (5) the Native group consists of Quaternary alluvium from the bottom of the Native 4 soil horizon (2.0 feet) to the bedrock contact; and (6) the Bedrock group consists of consolidated geologic material from the undifferentiated Laramie/Arapahoe Formations.

Artificial fill is present directly beneath the 903 Pad and in the Lip Area as a result of previous remediation activities. In November 1968 "slightly-contaminated" soil was graded from outside the fence at the 903 Pad into the fenced area to be capped. In September of 1969 a base coarse

(artificial fill) material overlay, soil sterilant, and asphalt primer were constructed for the 903 "containment barrier" (Pad). The asphalt pad was constructed in October of 1969 and was reportedly 3 in (7.6 cm) thick. The thickness of the base coarse materials beneath the 903 Pad was assumed to be approximately 8 inches (20 cm). In February 1970, operations were initiated to apply additional fill (base coarse) over the Lip Area due to soil contamination. The thickness of the fill material reportedly ranged from 0.8 in (2 cm) to 5.1 in (13 cm) (DOE, 1995; RMRS, 1997b).

## 1.5 SITE CONCEPTUAL MODEL

The contaminants present in the surface and subsurface soil are primarily a result of drum storage in the 903 Pad area. Drums containing hydraulic fluids and lathe coolant contaminated with plutonium and uranium leaked onto the surface soil. The liquids from the drums may have moved downward towards the bedrock surface, possibly carrying a fraction of the radionuclides into the subsurface along preferential pathways such as rodent holes, desiccation cracks, and/or along decayed roots. High winds and heavy rains spread the surficial radiological contamination outward from the 903 Pad, depositing it on surface soils in the Lip Area and Americium Zone.

Previous HPGe surveys from the study area and surface soil sample data show that, in general, higher concentrations are present near the 903 Pad, and concentrations decrease with increasing distance from the 903 Pad. Immediately east and south of the 903 Pad and Lip Area, there are areas of higher concentrations which may be the result of wind and surface water dispersion of contaminants (DOE, 1995). Accounting for the surface soil and HPGe sampling already collected from the 903 Pad area to Indiana Street, and the direction of surface water flow from the 903 Pad towards the South Interceptor Ditch, it was concluded that hot spots are not likely to be present to the east, outside of the Investigation Area (Figure 1-4).

The source of subsurface VOC contamination is suspected to be present directly beneath the area where drums were previously stored (DOE, 1995; RMRS; 1997b). The liquid contained in the drums may have migrated downward towards the bedrock surface. An east-west paleochannel is cut into the bedrock, with the greatest depth to bedrock located toward the middle of the 903 Pad (DOE, 1995; RMRS, 1997b; RMRS, 1997c). Available subsurface and groundwater VOC data

(see Section 1.3) indicates that any potential source of DNAPL contamination is limited to the area under the present 903 Pad. The VOC contamination east of the 903 Pad is limited to the dissolved phase in groundwater as supported by groundwater data (see Section 1.3.3) (DOE, 1995; RMRS, 1998e).

## 1.6 PROJECT INVESTIGATION AREA

Based on the foregoing evaluation of the existing data in the study area, an Investigation Area was defined for this site characterization that represents the area where additional data is required to refine the volume estimate of contaminated soils (Figure 1-4). The Investigation Area represents that portion of the study area which is known, or in which a potential exists, for surface and/or subsurface soils to exceed Tier I RSALs and current Tier I SSALs. These areas include:

- Surface soils exceeding 10 pCi/g  $^{241}\text{Am}$  as identified in the 1990 and 1994 HPGe surveys;
- Areas where artificial fill (and asphalt) has been placed over natural soils including the 903 Pad, Lip Area, and areas remedied in 1976, 1978, and 1984;
- Five 2.5-acre plots identified as exceeding Tier I soil action levels based on OU2 RFI/RI surface soil sampling results; and
- The 903 Pad and Lip Area where a subsurface VOC source is suspected as the source of a groundwater contaminant plume.

## 2.0 FIELD INVESTIGATION

### 2.1 OVERVIEW

The lateral and vertical extent of radiological and VOC contamination was assessed within the proposed investigation area. The lateral extent of radiological contamination in the Americium Zone and a portion of the Lip Area were primarily assessed using a non-intrusive HPGe field method. The HPGe method results were "standardized" by correlation to radiochemical data collected by sampling surface soils from selected HPGe measurement locations, and analyzing these samples for radionuclides using alpha spectroscopy. The lateral and vertical extent of contamination at the 903 Pad and a majority of the Lip Area were assessed utilizing sample collection methods employing a Geoprobe®, and analyzing the samples for radionuclides and VOCs in a laboratory. The data were collected pursuant to the Sampling and Analysis Plan for the Site Characterization of the 903 Drum Storage Area (IHSS 112), 903 Lip Area (IHSS 155), and Americium Zone (SAP) (RMRS, 1998a).

### 2.2 SURFACE SOIL INVESTIGATION

The activities of  $^{241}\text{Am}$ ,  $^{239/240}\text{Pu}$ ,  $^{233/234}\text{U}$ ,  $^{235}\text{U}$ , and  $^{238}\text{U}$  in surface soils within the Americium Zone and a portion of the Lip Area were measured *in situ* using an HPGe survey together with radiochemical analyses of surface soil samples.

#### 2.2.1 HPGe Methodology

The HPGe instrument measures *in situ* activities of  $^{241}\text{Am}$ ,  $^{235}\text{U}$  and  $^{238}\text{U}$ . For this investigation, the HPGe measurement had a field of view (FOV) of 10 meters (m) in diameter with the detector placed 1-m over the ground surface. The Compendium of *In Situ* Radiological Methods and Applications at Rocky Flats Plant (EG&G, 1993) provides a detailed discussion on the physics of *in situ* measurement of radionuclides in the environment.

The HPGe survey focused on the Americium Zone (Figure 2-1) and includes all surface soils with elevated concentrations of  $^{239/240}\text{Pu}$  and/or  $^{241}\text{Am}$  identified during the OU2 RFI/RI including:

- The 35 HPGe measurements which exhibit elevated (above 10 pCi/g)  $^{241}\text{Am}$  activities;
- The area directly below the culvert which drains the 903 Pad and Lip Area where sediments are deposited during surface runoff events; and
- The five 2.5-acre plots where surface soils exceed Tier I RSALs.

The HPGe system used to perform *in situ* measurements for the investigation employs the Canberra *In Situ* Object Counting System (ISOCS) software. In order to estimate counting efficiencies, this software requires the entry of various parameters which should accurately represent the actual field conditions at the site. One important parameter is the distribution of contaminants vertically. In the HPGe investigation area, contamination was deposited via airborne and/or surface water releases. This resulted in a distribution with high activities near the surface and decreasing activities with depth, which may follow an exponential function. Surface soil sampling was previously performed in the study area to determine the vertical distributions. In general, the radionuclides are concentrated in the top 5-cm. Based on available data, the ISOCS model assumes all contamination is contained in the top 5-cm, and it is distributed with 66% in the top 3-cm and 33% in the next 2-cm. This distribution was used to be consistent with the surface soil sampling methodologies (RMRS, 1998a), which specifies sampling surface soil to a depth of two inches (5 cm). In addition, the contribution from  $^{241}\text{Am}$  below a depth of 5 cm in soil is quite small. It is possible that the actual distributions in the top 5-cm may be more concentrated near the surface or more uniformly distributed throughout the 5-cm layer. A set of efficiencies with different vertical distributions was prepared and the standard acquisition analyzed.

#### Results:

Default 2 layer 0-3 cm 66%, 3-5 cm 33%	$^{241}\text{Am} = 12.2 \text{ pCi/g}$
Single layer, 0-5 cm uniform	$^{241}\text{Am} = 14.3 \text{ pCi/g}$
3 layers, 0-1.5cm 50%, 1.5-3 cm 30%, 3-5 cm 20%	$^{241}\text{Am} = 11.6 \text{ pCi/g}$
3 layers, default with 1cm grass cover	$^{241}\text{Am} = 13.2 \text{ pCi/g}$
2 layer with 0-3 cm 60%, 3-5 cm 40%	$^{241}\text{Am} = 12.2 \text{ pCi/g}$

As can be seen, the overall error of a likely range of possible distributions is about +/- 10 %.

## 2.2.2 Double Sampling Correlation Technique

To "standardize" the *in situ* method, a double sampling technique was employed whereby soil samples were collected from select HPGe measurement locations (RMRS, 1998a) and analyzed in the laboratory for  $^{241}\text{Am}$ ,  $^{239/240}\text{Pu}$ ,  $^{233/244}\text{U}$ ,  $^{235}\text{U}$ , and  $^{238}\text{U}$  using alpha spectroscopy, and  $^{241}\text{Am}$  and  $^{235}\text{U}$  using gamma spectroscopy. [The gamma spectroscopy data was collected by the laboratory to simply "validate" the alpha spectroscopy results, and the two sets of results are comparable as indicated by their linear relationship with a slope of one [(Table 2-1) (Figure 2-2)].

**Table 2-1 Laboratory Gamma Spectroscopy Results vs. Laboratory Alpha Spectroscopy Results –  $^{241}\text{Am}$**

HPGe Measurement Location	Laboratory Gamma Spectroscopy Results $^{241}\text{Am}$ (pCi/g) dry wt	Laboratory Alpha Spectroscopy Results $^{241}\text{Am}$ (pCi/g) dry wt
30*	3.67	3.67
104	19.08	27.80
265	45.46	49.32
266	21.89	22.60
305	7.45	11.05
406	107.86	77.27
460*	111.09	148.23
669*	57.84	57.85

\* Real and Duplicate Sample Results Averaged

In order to acquire a good double sampling correlation over the anticipated range of  $^{241}\text{Am}$  activities, eight HPGe measurement locations were selected that encompass five  $^{241}\text{Am}$  activity intervals; 0-10 (three measurements), 10-20, 20-50 (two measurements), 50-100, and 100-200 pCi/g. These intervals were selected based on detection frequencies of  $^{241}\text{Am}$  activities measured in surface soil samples collected in support of the OU2 Phase II RFI/RI (DOE, 1995; RMRS, 1998a).

Multiple HPGe measurements were taken at some of the double sampling locations for quality control. These results are provided in Table 2-2. In these cases, the measurements at each double sampling location were averaged to create the HPGe data set used in the correlation. Table 2-2 also indicates the HPGe measurements at each double sampling location are relatively uniform.

Table 2-2 HPGe <sup>241</sup>Am Results at Double Sampling Locations

HPGe Measurement 30		HPGe Measurement 104		HPGe Measurement 265		HPGe Measurement 266		HPGe Measurement 305		HPGe Measurement 406		HPGe Measurement 460		HPGe Measurement 669	
Count Duration (sec)	<sup>241</sup> Am (pCi/g)	Count Duration (sec)	<sup>241</sup> Am (pCi/g)	Count Duration (sec)	<sup>241</sup> Am (pCi/g)	Count Duration (sec)	<sup>241</sup> Am (pCi/g)	Count Duration (sec)	<sup>241</sup> Am (pCi/g)	Count Duration (sec)	<sup>241</sup> Am (pCi/g)	Count Duration (sec)	<sup>241</sup> Am (pCi/g)	Count Duration (sec)	<sup>241</sup> Am (pCi/g)
900	1.1	900	14.5	900	34.3	900	9.1	1200	7.0	900	70.2	900	106.3	900	32.2
		900	17.6	900	39.0			1200	7.5	900	62.9	900	113.2	1200	32.8
		900	20.6	900	39.1			1200	4.7	900	61.7	900	80.2	1200	39.5
		1200	15.5	900	37.3			1200	6.0	900	62.6	900	98.3	1200	35.3
		1200	22.6	900	31.7			1200	4.9	900	65.9	900	115.7	1200	35.2
		1200	17.6	900	29.2			1200	5.7	900	80.8				
		1200	23.0	900	31.3			1200	5.4						
		900	15.1	900	39.3			1200	4.0						
		900	17.6	900	34.4										
		1200	13.0												
		1200	18.6												
		1200	19.4												
		1200	15.8												
		1200	15.8												
Average	1.1		17.6		35.1		9.1		4.7		64.7		99.1		35.0

Fifteen (15) grab samples were then collected at each double sampling location; one grab sample from the center; four grab samples collected at 1-m radius, and ten grab samples from 3-m radius. Figure 2-3 provides this surface soil sampling geometry which was developed by the DOE (DOE, 1997) at the Fernald Environmental Management Project site in Ohio in order to correlate HPGe results to surface soil results. The 1-m and 3-m radius grab samples were then composited into a 1-m and 3-m sample representative of each individual band. Therefore, three separate alpha (and gamma) spectroscopy analyses were performed at each double sampling location.

Samples were collected in this "bull's eye" pattern to mimic the averaging done by the field HPGe detector over the instrument's FOV. The HPGe detector receives gamma-ray photons from every point within the circle; however, it receives more gamma rays from soil closer to the detector than from soil further from the detector. If the circle is divided into concentric bands, the relative weighting factor for each band can be calculated based upon the percentage influence of gamma photons at the detector which originates from a given band of soil, assuming a uniform source distribution with depth and a one MeV photon energy. The relative weighting factor is the relative importance of each band with respect to the probability of gamma-rays emitted from within that band being detected by the HPGe (Table 2-3). The sample results were multiplied by the weighting factor per band, then the products were summed to determine the activity of the soils in the FOV area. Tables 2-4 and 2-5 provide the results of these calculations, including adjustment for moisture content in order to report results on a wet weight or "in situ moisture" basis. Note that if field duplicate samples were collected at a given double sampling location, the "real" and "duplicate" data were averaged (denoted as "combined"), and the "combined" data were used in the weighted averaging process to develop the data for the correlation.

**Table 2-3 Surface Soil Samples, Weighted Average Calculations**

Horizontal Distance from Point Under Detector (m)	Weight (per circle)
0	0.1
1	0.36
3	0.54
Total	1.00



**Table 2-4 Alpha Spectroscopy Results for <sup>241</sup>Am at Double Sampling Locations**

HPGe Measurement Location	Sample Type	Sample No.	Radius (m)	Am-241 (pCi/g)	Moisture Content (%)	Am-241 Weighted Average (pCi/g)	Am-241 Weighted Average Corrected for Moisture (pCi/g)
30	Real	99A5936-002.001	0	2.3659	4.99	.24	.2253
	Real	99A5936-004.001	1	4.6643	4.6	1.68	1.6053
	Real	99A5936-006.001	3	3.574	5.18	1.93	1.8349
	Average			3.535		3.85	3.666
30	Duplicate	99A5936-003.001	0	1.7105	4.99	.17	.1629
	Duplicate	99A5936-005.001	1	4.4612	4.6	1.61	1.5354
	Duplicate	99A5936-007.001	3	3.1966	5.18	1.73	1.6412
	Average			3.123		3.50	3.339
30	Combined		0	2.0382	4.99	.2	.1941
	Combined		1	4.5628	4.6	1.64	1.5704
	Combined		3	3.3853	5.18	1.83	1.738
	Average			3.329		3.67	3.503

HPGe Measurement Location	Sample Type	Sample No.	Radius (m)	Am-241 (pCi/g)	Moisture Content (%)	Am-241 Weighted Average (pCi/g)	Am-241 Weighted Average Corrected for Moisture (pCi/g)
104	Real	98A5590-001.002	0	11.2017	4.28	1.12	1.0742
	Real	98A5590-001.004	1	29.3735	3.63	10.57	10.2041
	Real	99A5590-004.001	3	29.824	2.56	16.1	15.703
	Average			23.466		27.80	26.981

HPGe Measurement Location	Sample Type	Sample No.	Radius (m)	Am-241 (pCi/g)	Moisture Content (%)	Am-241 Weighted Average (pCi/g)	Am-241 Weighted Average Corrected for Moisture (pCi/g)
265	Real	98A5590-002.002	0	36.6004	2.34	3.66	3.5764
	Real	98A5590-002.004	1	70.1548	9.99	25.26	22.9618
	Real	98A5590-002.006	3	37.785	2.83	20.4	19.8424
	Average			48.180		49.32	46.381

HPGe Measurement Location	Sample Type	Sample No.	Radius (m)	Am-241 (pCi/g)	Moisture Content (%)	Am-241 Weighted Average (pCi/g)	Am-241 Weighted Average Corrected for Moisture (pCi/g)
266	Real	98A3372-003.002	0	33.7418	18.91	3.37	2.8376
	Real	98A3372-003.004	1	22.6443	9.6	8.15	7.4379
	Real	98A3372-003.006	3	20.503	12.55	11.07	9.8371
	Average			25.630		22.60	20.113

**Table 2-4 Alpha Spectroscopy Results for <sup>241</sup>Am at Double Sampling Locations  
(Cont.)**

HPGe Measurement Location	Sample Type	Sample No.	Radius (m)	Am-241 (pCi/g)	Moisture Content (%)	Am-241 Weighted Average (pCi/g)	Am-241 Weighted Average Corrected for Moisture (pCi/g)
305	Real	98A5590-003.002	0	9.947	5.04	.99	.947
	Real	98A5590-003.004	1	9.2659	1.13	3.34	3.2985
	Real	98A5590-003.006	3	12.4345	1.2	6.71	6.635
		Average		10.549		11.05	10.88

HPGe Measurement Location	Sample Type	Sample No.	Radius (m)	Am-241 (pCi/g)	Moisture Content (%)	Am-241 Weighted Average (pCi/g)	Am-241 Weighted Average Corrected for Moisture (pCi/g)
406	Real	98A3372-001.002	0	101.9353	5.91	10.19	9.6247
	Real	98A3372-001.004	1	77.7979	5.2	28.01	26.6229
	Real	98A3372-001.006	3	72.3595	4.38	39.07	37.4345
		Average		84.031		77.27	73.682

HPGe Measurement Location	Sample Type	Sample No.	Radius (m)	Am-241 (pCi/g)	Moisture Content (%)	Am-241 Weighted Average (pCi/g)	Am-241 Weighted Average Corrected for Moisture (pCi/g)
460	Real	98A3372-002.002	0	90.1227	11.65	9.01	8.0719
	Real	98A3372-002.004	1	151.9866	12.66	54.72	48.5666
	Real	98A3372-002.006	3	137.9899	8.67	74.51	68.5696
		Average		126.700		138.24	125.208
460	Duplicate	99A3372-002.007	0	175.1638	11.65	17.52	15.6887
	Duplicate	99A3372-002.008	1	172.9098	12.66	62.25	55.2526
	Duplicate	99A3372-002.009	3	145.2979	8.67	78.46	72.201
		Average		164.457		158.22	143.142
460	Combined		0	132.6433	11.65	13.26	11.8803
	Combined		1	162.4482	12.66	58.48	51.9096
	Combined		3	141.6439	8.67	76.49	70.3853
		Average		145.578		148.23	134.175

**Table 2-4 Alpha Spectroscopy Results for <sup>241</sup>Am at Double Sampling Locations (Cont.)**

HPGe Measurement Location	Sample Type	Sample No.	Radius (m)	Am-241 (pCi/g)	Moisture Content (%)	Am-241 Weighted Average (pCi/g)	Am-241 Weighted Average Corrected for Moisture (pCi/g)
669	Real	99A4878-003.001	0	40.8194	8.62	4.08	3.758
	Real	99A4878-005.001	1	55.0517	10.	19.82	18.0169
	Real	99A4878-007.001	3	60.4235	7.99	32.63	30.2145
		Average		52.098		56.53	51.989
669	Duplicate	99A4878-004.001	0	75.9211	8.62	7.59	6.9896
	Duplicate	99A4878-006.001	1	66.7147	10.	24.02	21.8339
	Duplicate	99A4878-008.001	3	51.0332	7.99	27.56	25.519
		Average		64.556		59.17	54.342
669	Combined		0	58.3703	8.62	5.84	5.3738
	Combined		1	60.8832	10.	21.92	19.9254
	Combined		3	55.7284	7.99	30.09	27.8668
		Average		58.327		57.85	53.166

**Table 2-5 Alpha Spectroscopy Results for <sup>239/240</sup>Pu at Double Sampling Locations**

HPGe Measurement Location	Sample Type	Sample No.	Radius (m)	Pu-239/240 (pCi/g)	Moisture Content (%)	Pu-239/240 Weighted Average (pCi/g)	Pu-239/240 Weighted Average Corrected for Moisture (pCi/g)
30	Real	99A5936-002.001	0	12.8235	4.99	1.28	1.2214
	Real	99A5936-004.001	1	21.7524	4.6	7.83	7.4865
	Real	99A5936-006.001	3	23.8498	5.18	12.88	12.2446
		Average		19.475		21.99	20.953
30	Duplicate	99A5936-003.001	0	8.4155	4.99	.84	.8016
	Duplicate	99A5936-005.001	1	23.1372	4.6	8.33	7.9631
	Duplicate	99A5936-007.001	3	15.5486	5.18	8.4	7.9827
		Average		15.700		17.57	16.747
30	Combined		0	10.6195	4.99	1.06	1.0115
	Combined		1	22.4448	4.6	8.08	7.7248
	Combined		3	19.6992	5.18	10.64	10.1137
		Average		17.588		19.78	18.85

HPGe Measurement Location	Sample Type	Sample No.	Radius (m)	Pu-239/240 (pCi/g)	Moisture Content (%)	Pu-239/240 Weighted Average (pCi/g)	Pu-239/240 Weighted Average Corrected for Moisture (pCi/g)
104	Real	98A5590-001.002	0	61.0754	4.28	6.11	5.8569
	Real	98A5590-001.004	1	121.7496	3.63	43.83	42.2946
	Real	98A5590-001.006	3	161.424	2.56	87.17	84.9931
		Average		114.750		137.11	133.145

**Table 2-5 Alpha Spectroscopy Results for <sup>239/240</sup>Pu at Double Sampling Locations (Cont.)**

HPGe Measurement Location	Sample Type	Sample No.	Radius (m)	Pu-239/240 (pCi/g)	Moisture Content (%)	Pu-239/240 Weighted Average (pCi/g)	Pu-239/240 Weighted Average Corrected for Moisture (pCi/g)
265	Real	98A5590-002.002	0	150.7151	2.34	15.07	14.7269
	Real	98A5590-002.004	1	150.3247	9.99	54.12	49.2016
	Real	98A5590-002.006	3	151.1863	2.83	81.64	79.3938
		Average		150.742		150.83	143.322

HPGe Measurement Location	Sample Type	Sample No.	Radius (m)	Pu-239/240 (pCi/g)	Moisture Content (%)	Pu-239/240 Weighted Average (pCi/g)	Pu-239/240 Weighted Average Corrected for Moisture (pCi/g)
266	Real	98A3372-003.002	0	250.0412	18.91	25.00	21.0278
	Real	98A3372-003.004	1	194.6868	9.6	70.09	63.9482
	Real	98A3372-003.006	3	87.7801	12.55	47.4	42.1157
		Average		177.503		142.49	127.092

HPGe Measurement Location	Sample Type	Sample No.	Radius (m)	Pu-239/240 (pCi/g)	Moisture Content (%)	Pu-239/240 Weighted Average (pCi/g)	Pu-239/240 Weighted Average Corrected for Moisture (pCi/g)
305	Real	98A5590-003.002	0	80.7024	5.04	8.07	7.683
	Real	98A5590-003.004	1	67.9077	1.13	24.45	24.1736
	Real	98A5590-003.006	3	48.3793	1.2	26.12	25.815
		Average		65.663		58.64	57.672

HPGe Measurement Location	Sample Type	Sample No.	Radius (m)	Pu-239/240 (pCi/g)	Moisture Content (%)	Pu-239/240 Weighted Average (pCi/g)	Pu-239/240 Weighted Average Corrected for Moisture (pCi/g)
406	Real	98A3372-001.002	0	906.2229	5.91	90.62	85.5654
	Real	98A3372-001.004	1	524.8652	5.2	188.95	179.6117
	Real	98A3372-001.006	3	519.3453	4.38	280.45	268.6784
		Average		650.144		560.02	533.855

**Table 2-5 Alpha Spectroscopy Results for  $^{239/240}\text{Pu}$  at Double Sampling Locations (Cont.)**

HPGe Measurement Location	Sample Type	Sample No.	Radius (m)	Pu-239/240 (pCi/g)	Moisture Content (%)	Pu-239/240 Weighted Average (pCi/g)	Pu-239/240 Weighted Average Corrected for Moisture (pCi/g)
460	Real	98A3372-002.002	0	554.3172	11.65	55.43	49.6478
	Real	98A3372-002.004	1	1,481.6998	12.66	533.41	473.4706
	Real	98A3372-002.006	3	675.0613	8.67	364.53	335.4496
		Average		903.693		953.38	858.568
460	Duplicate	99A5936-002.001	0	782.3574	11.65	78.24	70.0723
	Duplicate	99A5936-004.001	1	684.6637	12.66	246.48	218.7812
	Duplicate	99A5936-006.001	3	841.5062	8.67	454.41	418.159
		Average		769.509		779.13	707.013
460	Combined		0	668.3373	11.65	66.83	59.86
	Combined		1	1,083.1818	12.66	389.95	346.1259
	Combined		3	758.2838	8.67	409.47	376.8043
		Average		836.601		866.25	782.79

HPGe Measurement Location	Sample Type	Sample No.	Radius (m)	Pu-239/240 (pCi/g)	Moisture Content (%)	Pu-239/240 Weighted Average (pCi/g)	Pu-239/240 Weighted Average Corrected for Moisture (pCi/g)
669	Real	99A4878-003.001	0	265.908	8.62	26.59	24.4806
	Real	99A4878-005.001	1	318.3239	10.	114.6	104.1787
	Real	99A4878-007.001	3	376.36	7.99	203.23	188.1974
		Average		320.197		344.42	316.857
669	Duplicate	99A4878-004.001	0	525.3358	8.62	52.53	48.3646
	Duplicate	99A4878-006.001	1	435.6164	10.	156.82	142.5654
	Duplicate	99A4878-008.001	3	297.2583	7.99	160.52	148.6429
		Average		419.404		369.87	339.573
669	Combined		0	395.6219	8.62	39.56	36.4226
	Combined		1	376.9702	10.	135.71	123.372
	Combined		3	336.8092	7.99	181.88	168.4202
		Average		369.800		357.15	328.215

### 2.2.2.1 Alpha Spectroscopy/HPGe $^{239/240}\text{Pu}$ and $^{241}\text{Am}$ Correlations

The linear regressions (using the method of least squares) between the alpha spectrometry data ( $^{239/240}\text{Pu}$  and  $^{241}\text{Am}$ ) and the HPGe data ( $^{241}\text{Am}$ ) show very high degrees of correlation (Figures 2-4 and 2-5). The correlation coefficients (R) are greater than or equal to 0.97. The  $^{241}\text{Am}$  (alpha spectrometry) to  $^{241}\text{Am}$  (HPGe) correlation has a slope (1.25) near 1.0 and a small intercept (4.43 pCi/g) near zero as would be expected when correlating the activities of the same radionuclide.

The  $^{239/240}\text{Pu}$  (alpha spectrometry) to  $^{241}\text{Am}$  (HPGe) correlation has a slope of 8.08 which is within the expected range of  $^{239/240}\text{Pu}$  to  $^{241}\text{Am}$  activity ratios considering the in-growth of  $^{241}\text{Am}$  in weapons grade plutonium over 30 to 40 years (elapsed time since the release). The intercept (3.24 pCi/g) is also small in magnitude. These results indicate the regression lines are appropriate models to correlate HPGe data to alpha spectrometry data.

However, according to the SAP (RMRS, 1998a), the 95% upper confidence limits (UCL) of the linear regressions are to provide the equations to calculate the activities of these isotopes in the surface soils at all *in situ* measurement locations (see Figures 2-4 and 2-5). Examination of the results from using the 95% UCL to determine RSAL exceedances strongly suggest this alternative "model" to be overly conservative. Figures 2-6, 2-7, and 2-8 show RSAL exceedances in surface soils in the Americium Zone based on the direct HPGe results<sup>1</sup>, the least square regression lines ("best fit" lines), and the 95% UCL equations for the "best fit" lines, respectively. Also plotted on these figures are RSAL comparisons for historical surface soil data (0-2 inches) from the OU2 RFI/RI trenching investigations (DOE, 1995) and a surface soil investigation conducted by the Actinide Migration Evaluation Project (RMRS, 1998f). These figures also provided RSAL comparisons for the alpha spectrometry results of surface soil samples collected at the eight double sampling locations for this investigation. Analytical results and RSAL comparisons for these surface soil samples are provided in Tables 2-6, 2-7, and 2-8.

As would be expected, Figures 2-6, 2-7, and 2-8 indicate progressively higher actinide levels in surface soils, i.e. increasing numbers of Tier I, and in particular, Tier II RSAL exceedances. As can be seen, the "best fit" line results (Figure 2-7) are substantiated by the historical data. For example, unlike the HPGe "direct" results (Figure 2-6), the Tier II exceedances plotted using the "best fit" line (Figure 2-7) extend to the south bordering on location TR09 (a Tier II exceedance),

<sup>1</sup> Because  $^{239/240}\text{Pu}$  is not measured directly by the HPGe instrument at low levels, the  $^{239/240}\text{Pu}$  data used to determine RSAL exceedances was estimated using the  $^{239/240}\text{Pu}$  to  $^{241}\text{Am}$  activity ratio of 5.8 derived from the slope of the regression line (Figure 2-9) for the  $^{239/240}\text{Pu}$  and  $^{241}\text{Am}$  alpha spectroscopy results from the surface soil samples collected at the eight double sampling locations (using real and duplicate sample results).



Table 2-6 Alpha Spectroscopy Results of Trench Soil Samples – OU2 RFI/RI

Location	Easting	Northing	Sample	Sampling Interval (cm)	QC	Analyte	Result	Units	Qual	Tier I SOR	Tier II SOR
TR04	2086630	748884	TR00422WCU2	0-3	REAL	Am-241	109.9000	pCi/g	J	0.889	5.036
						Pu-239/40	535.3000	pCi/g			
						U-233,-234	1.0080	pCi/g			
						U-235	0.0819	pCi/g			
						U-238DA	1.3520	pCi/g			
TR05	2086570	748918	TR00421WCU2	3-6	REAL	Am-241	63.7300	pCi/g	J	0.622	3.523
						Pu-239/40	459.9000	pCi/g			
						U-233,-234	1.2540	pCi/g			
						U-235	0.0359	pCi/g			
						U-238DA	1.5680	pCi/g			
TR09	2086350	748432	TR00367WCU2	0-3	REAL	Am-241	71.1800	pCi/g	J	0.789	4.468
						Pu-239/40	646.6000	pCi/g			
						U-233,-234	2.2070	pCi/g			
						U-235	0.0000	pCi/g			
						U-238DA	2.2070	pCi/g			
TR09	2086350	748432	TR00366WCU2	3-6	REAL	Am-241	34.1200	pCi/g	J	0.429	2.433
						Pu-239/40	381.3000	pCi/g			
						U-233,-234	1.4260	pCi/g			
						U-235	0.0483	pCi/g			
						U-238DA	1.6100	pCi/g			
TR09	2086350	748432	TR00300WCU2	0-3	REAL	Am-241	23.3700	pCi/g	J	0.251	1.424
						Pu-239/40	198.7000	pCi/g			
						U-233,-234	1.1960	pCi/g			
						U-235	0.0636	pCi/g			
						U-238DA	1.3920	pCi/g			

**Table 2-6 Alpha Spectroscopy Results of Trench Soil Samples – OU2 RFI/RI**  
(Cont.)

Location	Eastings	Northing	Sample	Sampling Interval (cm)	QC	Analyte	Result	Units	Qual	Tier I SOR	Tier II SOR
TR09	2086350	748432	TR00299WCU2	3-6	REAL	Am-241	22.2800	pCi/g		0.251	1.422
						Pu-239/40	204.4000	pCi/g			
						U-233,-234	2.0480	pCi/g			
						U-235	0.0439	pCi/g	J		
						U-238DA	1.6620	pCi/g			
TR11	2086830	748455	TR00284WCU2	0-3	REAL	Am-241	15.5600	pCi/g		0.139	0.785
						Pu-239/40	88.6500	pCi/g			
						U-233,-234	1.6220	pCi/g			
						U-235	0.0796	pCi/g	J		
						U-238DA	1.5400	pCi/g			
TR12	2087340	749045	TR00283WCU2	3-6	REAL	Am-241	8.3860	pCi/g		0.081	0.461
						Pu-239/40	53.9900	pCi/g			
						U-233,-234	1.4840	pCi/g			
						U-235	0.0921	pCi/g	J		
						U-238DA	1.7660	pCi/g			
TR12	2087340	749045	TR00267WCU2	0-3	REAL	Am-241	34.1700	pCi/g		0.577	3.271
						Pu-239/40	591.2000	pCi/g			
						U-233,-234	1.0140	pCi/g			
						U-235	0.1239	pCi/g	J		
						U-238DA	1.8320	pCi/g			
TR12	2087340	749045	TR00266WCU2	3-6	REAL	Am-241	13.5300	pCi/g		0.131	0.743
						Pu-239/40	93.0900	pCi/g			
						U-233,-234	0.7726	pCi/g			
						U-235	0.0323	pCi/g	J		
						U-238DA	1.3680	pCi/g			

SOR = Sum of ratios. Source: DOE, 1995



**Table 2-7 Alpha Spectroscopy Results of Surface Soil Samples – HPGe Double Sampling Locations**

HPGe Measurement Location	Easting	Northing	Am-241 (pCi/g)	Pu-239/240 (pCi/g)	U-233/234 (pCi/g)	U-235 (pCi/g)	U-238 (pCi/g)	Tier I SOR	Tier II SOR
30	2087180.071	749564.78	3.503	18.850	0.784	0.075	1.128	0.03	0.18
104	2086540.732	748734.16	26.981	133.145	0.899	0.072	1.315	0.22	1.26
265	2086703.63	749219.19	46.381	143.322	0.795	0.063	1.472	0.32	1.81
266	2086716.983	749249.52	20.113	127.092	0.684	0.026	0.915	0.18	1.05
305	2087381.285	749310.79	10.880	57.672	0.797	0.041	1.108	0.09	0.53
406	2086548.208	749086.09	73.682	533.855	0.804	0.077	1.671	0.72	4.08
460	2086554.05	749026.53	134.175	782.790	0.967	0.069	2.197	1.18	6.66
669	2085947.078	748667.47	53.166	328.215	0.748	0.028	1.108	0.48	2.72

Radionuclide results reported as the weighted averages over the HPGe measurement's field of view.  
SOR = Sum of ratios.

**Table 2-8 Alpha Spectroscopy Results of Surface Soil Samples – Actinide Migration Evaluation Project**

Sample Number	Easting	Northing	Am-241 (pCi/g)	Pu-239/240 (pCi/g)	U-233/234 (pCi/g)	U-235 (pCi/g)	U-238 (pCi/g)	Tier I SOR	Tier II SOR
SSSE05398	2087390	749012	20.100	397.000	NA	NA	NA	0.37	2.10
SSSE05498	2087398	748502	0.855	4.770	NA	NA	NA	0.01	0.04

NA = Not analyzed  
SOR = Sum of ratios.  
Source: RMRS, 1998f

and extend to the east encompassing locations TR12 and AME 5398 (also Tier II exceedances). Also, unlike the 95% UCL results (Figure 2-8), the "best fit" results (Figure 2-7) indicate actinide levels below Tier II to the north at HPGe Measurement Location 30, to the east at HPGe Measurement Location 305, and southeast at TR11. Thus, RSAL exceedances for the "best fit" line (Figure 2-7) are most consistent with the historical and the alpha spectroscopy data, and the best fit line is the chosen model to standardize the HPGe results.

#### 2.2.2.2 Alpha Spectroscopy/HPGe $^{235}\text{U}$ , $^{238}\text{U}$ Correlations

As shown in Figures 2-10 and 2-11, correlations for the alpha spectrometry/HPGe data for  $^{235}\text{U}$  and  $^{238}\text{U}$  were not performed because in both cases the uranium isotopes were not detected by *in situ* HPGe. The plots show minimum detectable activities when the isotopes were non-detected. Also, alpha spectrometry did not measure detectable levels of  $^{235}\text{U}$ , and only in a few instances was  $^{238}\text{U}$  detected at estimated activities. Therefore,  $^{235}\text{U}$  and  $^{238}\text{U}$  results from the HPGe survey in the Americium Zone were used directly as the surface soil radiological data for these isotopes. The lack of correlation for the uranium data does not impact the findings reported herein because the activities of uranium isotopes are well below the Tier II RSALs throughout the investigation area.

The activity of  $^{233/234}\text{U}$  was calculated based on the fact that  $^{234}\text{U}$  should be in equilibrium with  $^{238}\text{U}$  (the activity contribution of  $^{233}\text{U}$  is insignificant). The equilibrium between the radioactive parent ( $^{238}\text{U}$ ) and daughter ( $^{234}\text{U}$ ) suggests the activity ratio between these two isotopes should be 1.0. Surface soil data collected in support of the OU2 Phase II RFI/RI supports this relationship with an average activity ratio of 0.97 between the two isotopes. Therefore, the activity of  $^{233/234}\text{U}$  in surface soil was assigned the value measured by the HPGe survey for  $^{238}\text{U}$ .

#### 2.2.3 FIDLER Surveys

A FIDLER survey was conducted in a selected area where an isolated HPGe measurement exceeded the 10 pCi/g  $^{241}\text{Am}$  decision level. The FIDLER survey was conducted at HPGe measurement location 301 to determine if the measurement result was caused by the presence of a smaller area containing a hot spot. In addition, two FIDLER surveys were conducted at HPGe measurement locations 460 and 462 where HPGe measurements exceeded the RFCA Tier I

RSALs based on preliminary results using the sum-of-ratios methodology. The purpose of the survey was to determine whether contamination was homogeneous and widespread as suggested by the conceptual model, or heterogeneous and consists of numerous individual hot spots.

A grid with four-foot spacings was staked in the field to encompass the circular FOV for the HPGe measurement. A total of 37 FIDLER measurements were collected from each selected HPGe measurement location. FIDLER measurements were taken with the instrument placed on the ground surface at each of the four-foot grid nodes for a one-minute count. FIDLER surveys were conducted in accordance with Radiological Safety Procedure, 3-PRO-112-RSP-2.01, Job Aid: 4-JOB-010-RSP-02.01.07, Bicron FIDLER (Kaiser-Hill, 1999b).

## **2.3 SUBSURFACE SOIL INVESTIGATION**

The subsurface soil investigation consisted of two phases. One phase was the radiological investigation consisting of shallow boreholes. The second phase consisted of the VOC investigation.

### **2.3.1 Radiological Investigation**

Subsurface soil sampling for radiological characterization was conducted at the 903 Pad and Lip Area. The depth of radiological contamination is required to estimate the volume of soil requiring remedial action. Figure 2-12 provides the radiological subsurface sampling locations for the 903 Pad and Lip Area. Samples were analyzed for  $^{241}\text{Am}$ ,  $^{239/240}\text{Pu}$ ,  $^{233/244}\text{U}$ ,  $^{235}\text{U}$ , and  $^{238}\text{U}$  using alpha spectrometry. Boring logs are presented in Appendix A.

*903 Pad* - Twenty-five shallow boreholes were drilled for the characterization of radionuclide contamination beneath the 903 Pad. Twenty-five boreholes over the 3.4-acre 903 Pad represents a borehole completed at each node of a 23 m by 23 m (75 ft by 75 ft) grid (Figure 2-12).

Subsurface soil samples were collected from artificial fill material and natural soils beneath the 903 Pad for radiochemical analysis utilizing a single-tube Geoprobe hydraulic push drilling technique. Soils were continuously cored to a total depth of approximately 1.2 m (4 ft) to ensure core recovery or to a depth where the FIDLER indicated less than 5,000 cpm. Samples were

collected at approximately 15 cm (6 in) intervals or as appropriate so that the sample intervals coincide with asphalt, artificial fill material, and natural soils. This was done to prevent potential dilution of the natural soil samples below the artificial fill material. Borings and core were checked by engineer's tape for total depth and recovery. Samples for radiological screening were collected as a composite sample from the radiological sample. Soil samples were screened for alpha, beta/gamma, and VOCs using portable field instruments. If VOCs were detected above 10 parts per million by field instrumentation at any sampling location, the VOC subsurface soil sampling program, as described in the SAP (RMRS, 1998a), was implemented to characterize VOC contamination at that location.

Subsurface soil samples for radiochemical analysis were also collected during the VOC subsurface investigation as described in Section 2.3.2. Soil samples were collected from 12 original and three "step-out" boreholes on the 903 Pad, one borehole west of the 903 Pad, and one borehole east of well 07191 in the Lip Area (see Figure 2-13).

*Lip Area* - A total of thirty-seven boreholes were completed over the Lip Area where artificial fill was placed in 1970 and where surface soils were remediated in 1976, 1978, and 1984. Of the 37 boreholes, 25 borings were original and twelve were "step-out" borings (Figure 2-12). Of the 37 boreholes, two boreholes were completed in the 1976 remediation area, six boreholes were completed in the 1978 remediation area, and three boreholes were placed in the 1984 remediation area.

Shallow soil borings located in the 903 Lip Area and soil samples were collected utilizing single-tube Geoprobe hydraulic push drilling technique. Soils were continuously cored to either a total depth of 0.9 m (3 ft) or 1.2 m (4 ft) to ensure core recovery, or to a depth where the FIDLER indicated less than 5,000 cpm. Samples were collected at approximately 15 cm (6 in) intervals or as necessary so that the sample intervals coincide with artificial fill material and natural soils. This was done to prevent potential dilution of the natural soil sample below the artificial fill material. Borings and core were checked by engineer's tape for total depth and recovery. Samples for radiological screening were collected as a composite sample from the radiological sample. Soil samples were screened for alpha, beta/gamma, and VOCs using portable field instruments.

A detailed surface soil characterization using HPGe was not performed in portions of the Lip Area where surface/subsurface soils were collected (RMRS, 1998a).

### 2.3.2 VOC Investigation Boreholes

Investigation of VOC contamination at the 903 Pad, completed per the SAP (RMRS, 1998a), targeted the highest areas of groundwater contamination as well as the anomalous PCE soil gas results, east of groundwater well 07191. Figure 2-13 shows the borehole locations for the VOC investigation. Samples were analyzed for  $^{241}\text{Am}$ ,  $^{239/240}\text{Pu}$ ,  $^{233/244}\text{U}$ ,  $^{235}\text{U}$ , and  $^{238}\text{U}$  using alpha spectroscopy and for VOCs using EPA Method 8260B (EPA, 1986). Boring logs are presented in Appendix A.

Subsurface soil sampling was conducted near existing groundwater monitoring wells 06691, and 08891 using an upgradient radial placement geometry with the well location serving as the downgradient location. Boreholes were located approximately 20 ft to the north, south, and west of well locations 06691, and 08891. Six boreholes were placed along the west to northwest side of the 903 Pad on the basis of aerial photographs showing drum storage and surface staining. A total of 15 boreholes were required to investigate the VOC contamination at the 903 Pad, the original 12 boreholes, two "step-out" boreholes (95998 and 97698), and one completion of a shallow subsurface radiological borehole (90998) as a VOC borehole (96498) where VOCs were observed with concentrations greater than 10 percent of the respective current Tier I SSALs.

The soil gas anomaly in the Lip Area at the southeast corner of the 903 Pad adjacent to well 07191 was evaluated. One borehole (97298) was located 20 ft east and 10 ft south of well 07191. A surface area with little or no vegetation and FIDLER readings greater than 10,000 cpm was identified 30 feet east of well 6591, adjacent to the west side of the 903 Pad. One borehole (92598) was completed to evaluate this area.

Soil samples were collected from VOC soil borings located in the 903 Pad and Lip Area utilizing a dual-wall Geoprobe hydraulic push drilling technique. Boreholes were advanced from the surface to either a depth of 0.31 to 0.62-m (1 to 2 feet) below the top of bedrock, or to a depth below the vertical extent of VOC contamination (based on field instruments), whichever was

greater, provided refusal of the Geoprobe drilling equipment was not encountered. Samples were collected at approximately 1.22-m (4 ft) intervals below ground surface, or at intervals where VOCs were detected with field instrumentation. In general, the VOC samples were collected from approximately the lower 15-cm (6 in) interval and the radiological sample was collected from the 15-cm (6 in) interval above the VOC sample. Samples for radiological screening were collected from the 15-cm (6 in) interval above the radiological sample. Because of the different ionization potential between PCE and CCl<sub>4</sub>, two photoionization detectors were used (10.4 and an 11.7 electron volt bulb). If VOCs were detected above 10% of the current Tier I SSALs, then the sampling grid was extended an additional 6.1-m (20 ft) in an upgradient direction of that location, and additional samples were collected for laboratory analysis.

## 2.4 903 PAD ASPHALT SAMPLES

Asphalt samples from the 903 Pad were collected to obtain preliminary waste characterization data for disposal purposes. Nine asphalt samples were collected randomly from the following locations over the 903 Pad: 90098; 90198; 90398; 90698; 90798; 91198; 91298; 91898; and 91998 (Figure 2-12). Random sampling techniques are appropriate methods for estimating the population mean and the standard error of this estimate. Locations were determined randomly based on the 903 Pad subsurface soil sampling grid. Samples were collected using a Geoprobe® and analyzed for <sup>241</sup>Am, <sup>239/240</sup>Pu, <sup>233/234</sup>U, <sup>235</sup>U, and <sup>238</sup>U using alpha spectroscopy.

## 2.5 WORK CONTROLS

Field activities were conducted in accordance with the procedures detailed in the SAP (RMRS, 1998a), the Task-Specific Health and Safety Plan (RMRS, 1998b) and additional controls summarized herein. Additional work controls implemented for the project included the ALARA Job Review (#903Pad-98-001) for fieldwork performed under job-specific Radiation Work Permits (RWPs). Contamination control included measurement of direct and removable contamination levels on equipment, wind speed monitoring (soil handling activities suspended with two consecutive 15-minute wind speed average of 15 miles per hour), high volume air sampling during soil handling activities, and requirements for personal protective equipment. Fieldwork also could not be performed due to sensitivity of the radiological field instruments

when the humidity was greater than 90% and ambient temperatures less than 32 degrees Fahrenheit.

**THIS TARGET SHEET REPRESENTS A  
FOLD-OUT MAP**

(The map has been filmed and is placed at the end of  
the document)

**Characterization Report for the 903 Drum Storage  
Area, 903 Lip Area and Americium Zone**

Figure 2 - 1

**HPGe Measurement Location Map**

Map ID: 99-0408

September 24, 1999

U.S. DEPARTMENT OF ENERGY  
ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

ROCKY MOUNTAIN REMEDIATION SERVICES, L.L.C.  
GOLDEN, COLORADO

AR Document Number: \_\_\_\_\_ - \_\_\_\_ - \_\_\_\_\_



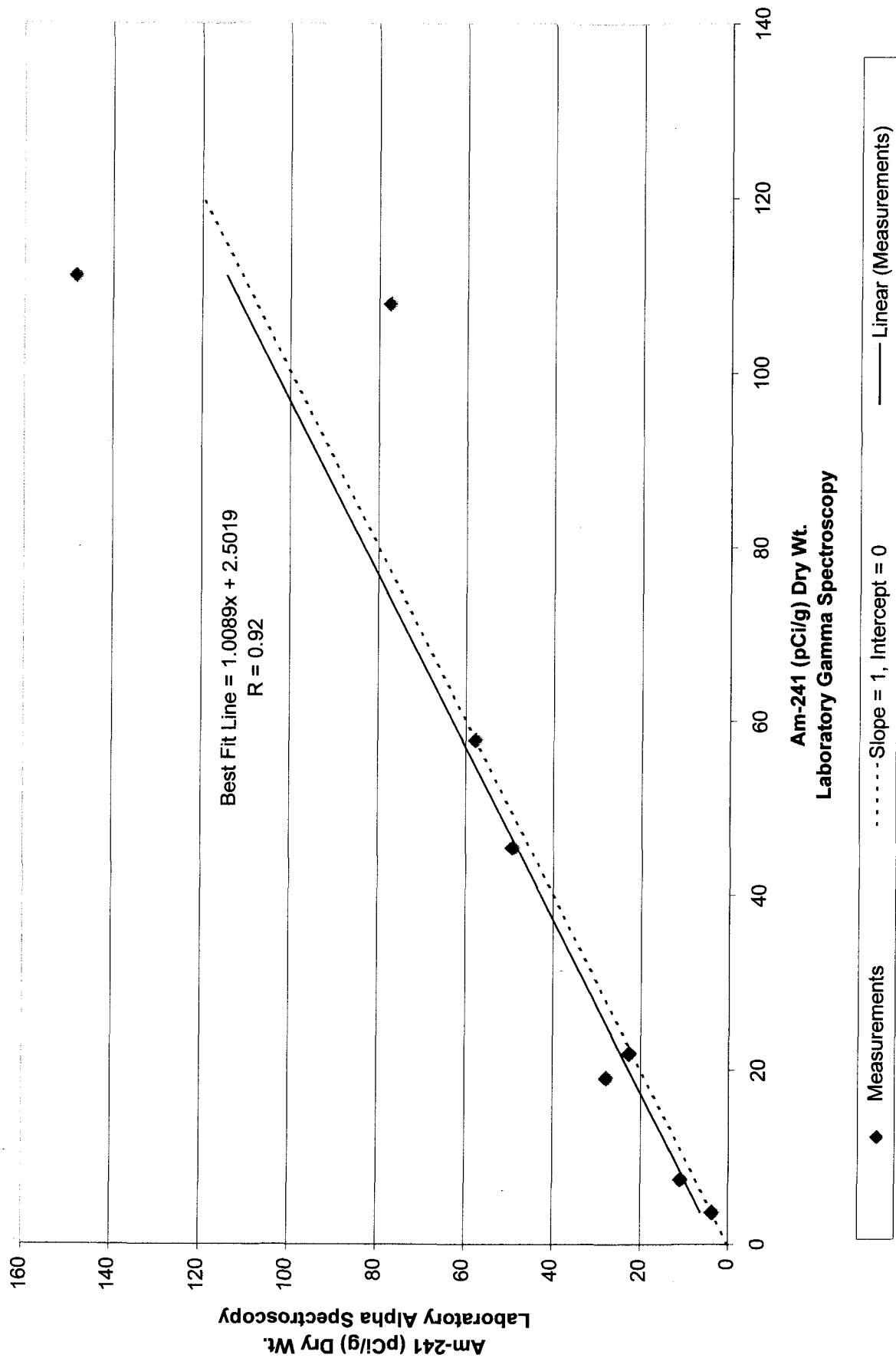
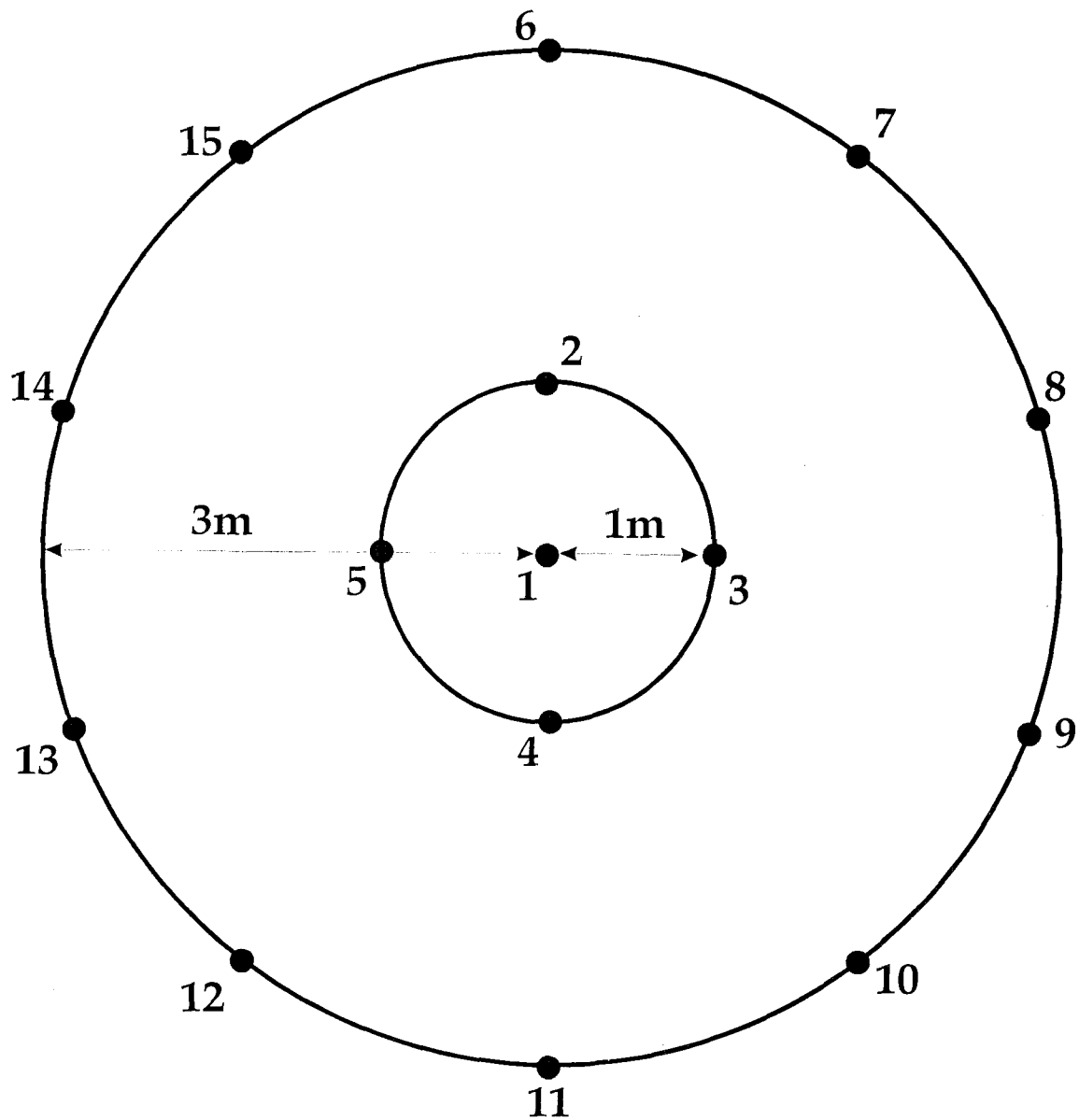


Figure 2-2 Americium-241 Activities in Soil - Gamma Spectroscopy vs. Alpha Spectroscopy Correlation



15-Point Sampling Pattern

Characterization Report for the 903 Drum  
Storage Area, 903 Lip Area  
and Americium Zone

HPGe 15-Point Surface Soil Sampling Pattern

Figure 2-3

Explanation:

● Grab Sampling Location

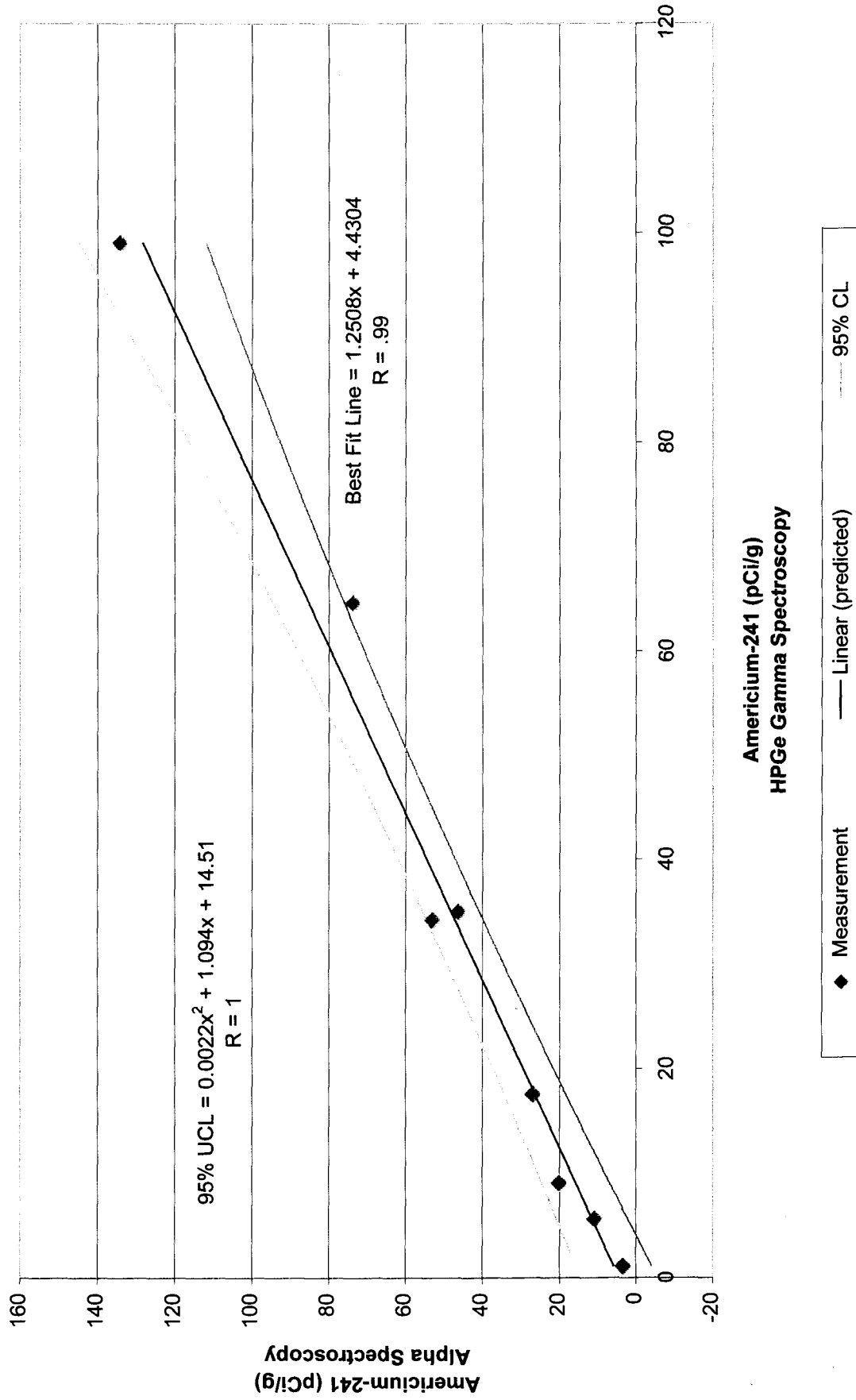


Figure 2-4 Alpha Spectroscopy vs. HPGe Gamma Spectroscopy - Americium-241 Correlation

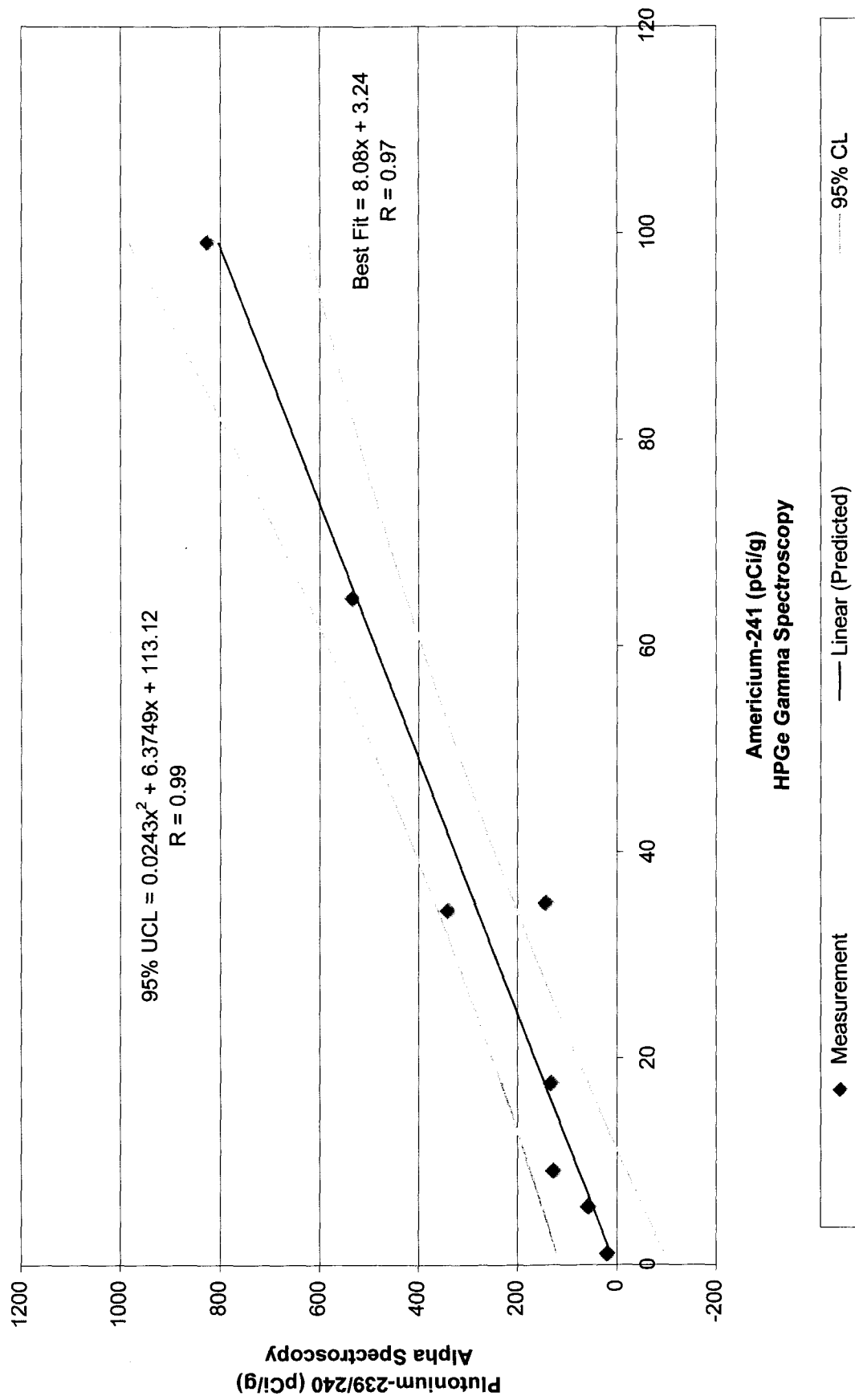


Figure 2-5 Alpha Spectroscopy vs. HPGe Gamma Spectroscopy - Americium-241 vs. Plutonium-239/240 Correlation

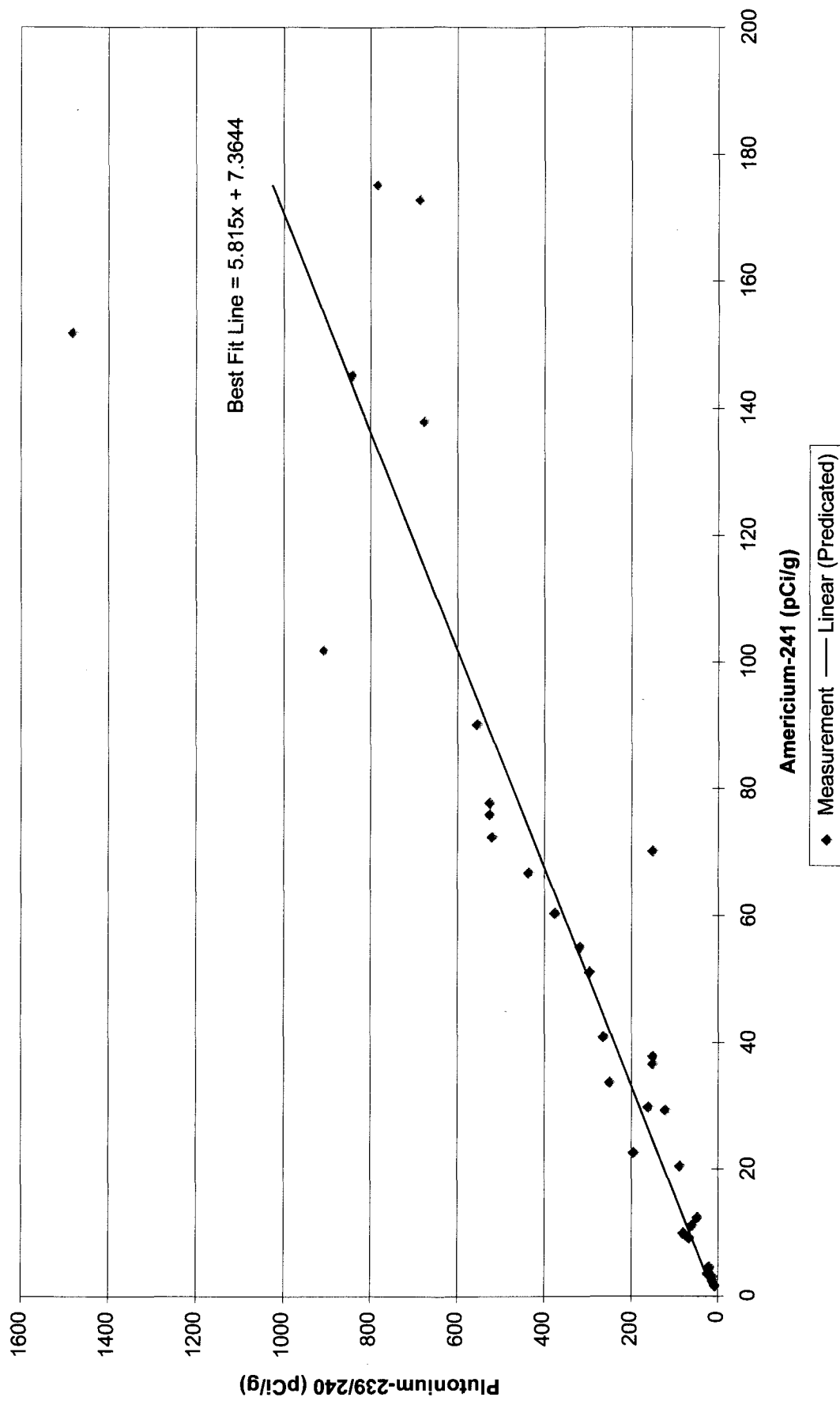


Figure 2-9 HPGe Survey Soil Sample Results- Plutonium239/240 vs. Americium-241 Correlation (Pu/Am Activity Ratio)

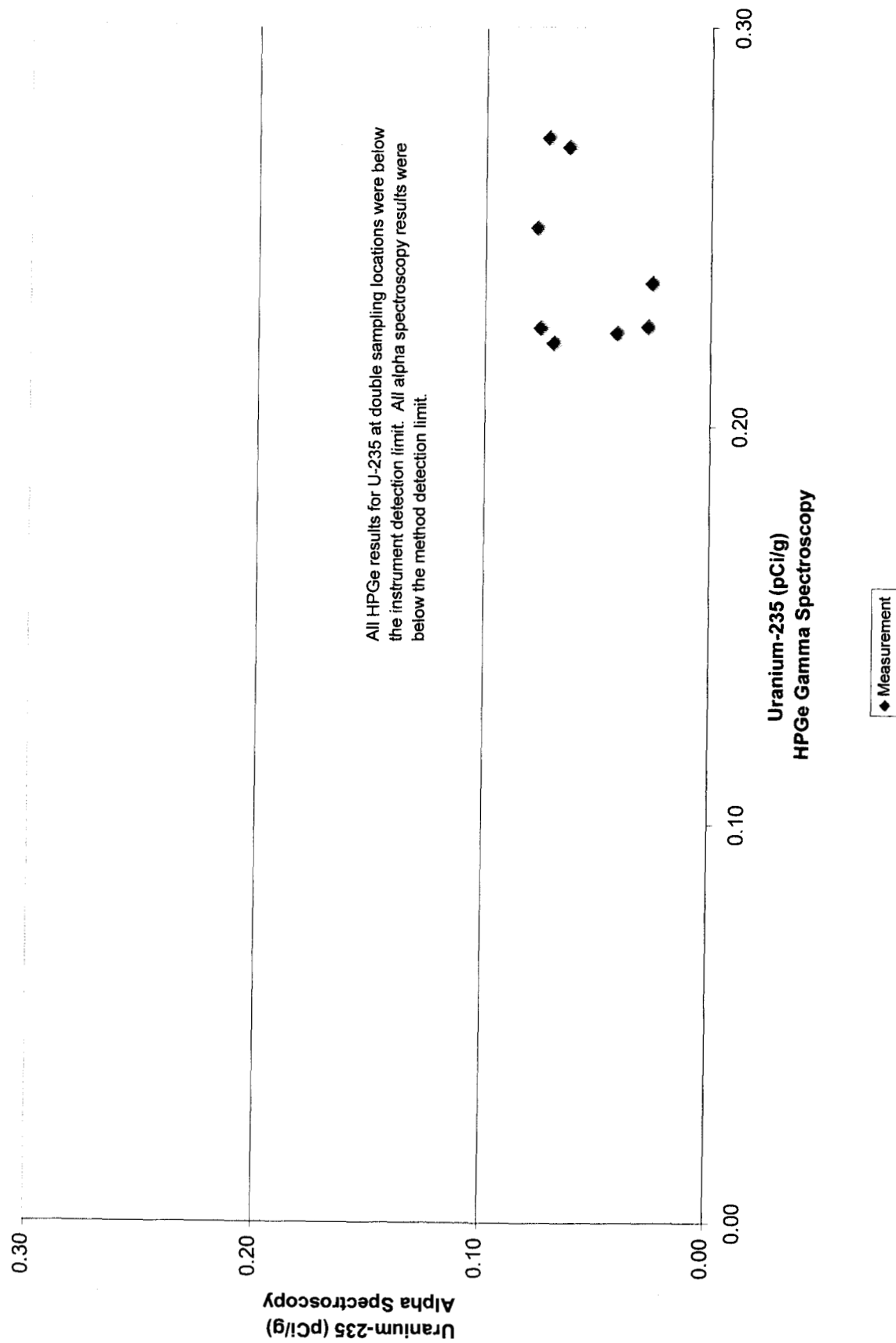


Figure 2-10 Alpha Spectroscopy vs. HPGe Gamma Spectroscopy - Uranium-235 Correlation

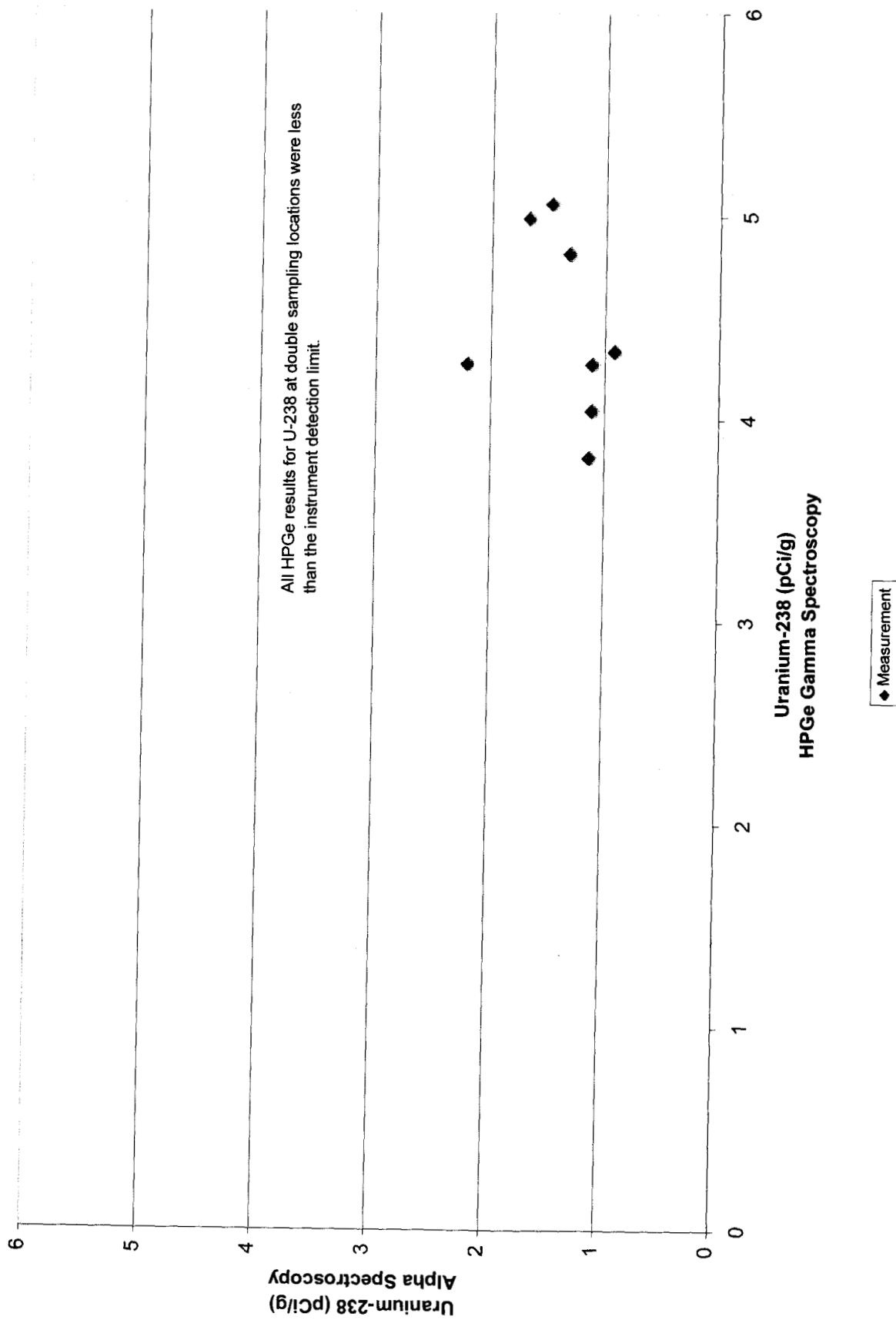


Figure 2-11 Alpha Spectroscopy vs. HPGe Gamma Spectroscopy - Uranium-238 Correlation

### 3.0 DATA QUALITY ASSESSMENT

This section provides the results of the data quality assessment that was conducted in accordance with the Evaluation of Data for Usability in Final Reports (RMRS Procedure, ER/RMRS-98-200 [RMRS, 1998c]). This assessment ensures that data used in making management decisions for remedial actions is of adequate quality to support the decisions.

As discussed herein, Data Quality Objectives for the project were achieved. A summary of project DQOs and the corresponding project decisions is presented in Table 3-1.

**Table 3-1 Sample Types & Data Quality Objectives**

Sample Type	DQO	Decision
Actinides in Surface Soils using <i>In Situ</i> Gamma Spectroscopy.	Quantify spatial distribution of RFETS actinide activities that meet or exceed Tier I RSALS to estimate soil volumes requiring remediation. Quantify spatial distribution of <sup>241</sup> Am to 10 pCi/g using HPGe gamma ray survey.	Spatial extent of actinide activities exceeding Tier I RSALS. Volume estimates of soils exceeding Tier I and Tier II RSALS.
VOCs in Subsurface Soils.	Quantify three-dimensional distribution of VOC concentrations that meet or exceed Tier I Soil Action Levels to estimate soil volumes requiring remediation.	Three-dimensional extent of VOC concentrations relative to Tier I soil action levels. Volume estimates of soils exceeding Tier I soil action levels.
Actinides in Subsurface Soils.	Quantify three-dimensional distribution of actinides to estimate soil volumes requiring remediation.	Three-dimensional extent of actinide activities relative to Tier I & II RSALS. Volume estimates of soils exceeding Tier I and II RSALS.

### 3.1 VERIFICATION OF RESULTS

Verification ensures that data produced and used by the project are documented and traceable per quality requirements. Generally, verification consists of reviewing the data to determine whether:

- Chain-of-Custody was intact from initial sampling through transport and final analysis;
- Preservation and hold-times were within tolerance;
- Selected samples underwent analysis at certified labs; and
- Format and content of the data is clearly presented relative to goals of the project.



In addition to the criteria noted above, verification of the data also included additional checks sometimes acknowledged as within the "validation" category, depending on the type of analysis:

- Surrogate recovery;
- MS/MSD recovery;
- Calibrations;
- Blanks;
- Sample preparations; and
- Other quality control.

In order to provide an integrated evaluation of the data quality, results of the verification are collectively discussed with validation in Section 3.2.

### 3.2 VALIDATION

Validation consists of a technical review of the data, or portion of the data, so that any limitations of the data relative to project goals are identified, and the associated data are qualified accordingly. Data were validated relative to the precision, accuracy, representativeness, completeness, and comparability (PARCC) parameters described in the next section. K-H Analytical Services Division also currently performs validation on a site-wide basis at 25% frequency. Satisfactory validation at this frequency indicates that the subcontracted labs are operating competently relative to industry-wide standards, and more specifically, that sample custody and analytical procedures are implemented under defined quality controls. Site-wide data validation coupled with annual lab audits provides the inference that all analytical and radiochemical results not specifically validated, are represented by the percentage that is validated.

Validation by an independent third party was performed on 37 percent of the alpha spectroscopy data and 32 percent of the VOC data, which exceeded the requirement of 25 percent validation by an independent third party. The remaining alpha spectroscopy and VOC data were verified by an independent third party. Original verification and validation (V&V) packages for the project are managed and filed by the K-H Analytical Services Division, Building 881.

Verification and validation of the project data, summarized in Sections 3.1 through 3.3, included use of the following protocols and guidance:

- RMRS Procedure RF/RMRS-98-200, Evaluation of Data for Usability in Final Reports (RMRS, 1998c);
- USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review, EPA 540/R-94/013, (EPA, 1994b);
- USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review, EPA 540/R-94/012, (EPA, 1994a);
- Guidance for Data Quality Assessment, Practical Methods for Data Analysis, EPA QA/G-9, (EPA, 1996b);
- Kaiser-Hill Team Quality Assurance Program, Rev. 5, (K-H, 1997); and
- RMRS Quality Assurance Program Description (QAPD), RMRS-QAPD-001, Rev. 2, (RMRS, 1998d).

### 3.3 PARCC PARAMETERS

#### 3.3.1 Precision

Precision is a measure of the reproducibility of results. Precision is evaluated by comparing results from field duplicate and/or replicate (duplicate/replicate) samples with results from associated real samples. Precision was evaluated quantitatively by using two functions, relative percent difference (RPD), and duplicate error ratio (DER), where the latter function is used to account for the stochastic nature of error of radioactivity.

Equations 3.1 and 3.2 present the RPD and DER equations

$$\text{RPD} = \frac{|C_1 - C_2|}{|(C_1 + C_2)/2|} * 100 \quad (\text{Eq. 3.1})$$

where:

$C_1$  = Concentration of the analyte in the real sample

$C_2$  = Concentration of the analyte in the duplicate sample

$$DER = \frac{|C_1 - C_2|}{\sqrt{(TPU^2_{C1} + TPU^2_{C2})}} \quad (\text{Eq 3.2})$$

where:

TPU = total propagated uncertainty

#### Duplicate/Replicate Sample Collection Methodology

Field duplicate samples collected in support of the surface soil programs were collected as unique samples. The duplicate samples were generated from grab samples of surface soils collected at HPGe measurement locations. The duplicate samples were collected adjacent to the real samples collected over the same HPGe FOV, composited, and placed into sample jars. Replicate and real samples of subsurface soils collected for alpha spectroscopy analysis were generated by splitting the recovered core in half lengthwise. VOC quality control (QC) samples are identified as duplicates because the real and QC samples were collected from adjacent depth intervals (i.e. not split).

The purpose of the field duplicate and replicates are to evaluate the precision of the field sampling process. The QC criterion for RPDs is  $\leq 40\%$ , and for DERs the criterion is  $\leq 1.96$ . Individual RPDs/DERs can be found in Appendix B. Duplicate/replicate samples exceeding the DER QC criterion of 1.96 are interpreted as different at the 5% level of significance. Duplicate/replicate samples exceeding the RPD QC criterion of 40%, indicate that precision does not comply with DQO specifications, and require an explanation and justification for deficiencies, and a determination if additional sampling is required. At least 85% of all quality control samples are required to comply with the established precision or RPD goals. The following sections describe the results of duplicate/replicate sample results for each laboratory analytical program.

#### In Situ Gamma Spectroscopy (HPGe) Program

The gamma spectroscopy unit collected a total of 1,110 *in situ* measurements. The required frequency of duplicate samples was one measurement for each set of 20 real measurements. A total of 58 duplicate measurements were collected (1 in 19.1) meeting the required collection frequency. All 58 duplicate measurements acquired were within error tolerances ( $DER \leq 1.96$ ) for  $^{241}\text{Am}$ . This excellent performance by the *in situ* system indicates the large-area, physical-

averaging is a repeatable method. Appendix B provides the TPU for HPGe measurements used in the DER calculations.

#### Laboratory Gamma Spectroscopy

A total of 24 real and nine duplicate surface soil samples (1 in 2.7) from three double sampling HPGe measurement locations were provided to the laboratory for gamma spectroscopy analysis for  $^{241}\text{Am}$ . The frequency for duplicate sample collection for gamma spectroscopy analysis was met for this program.  $^{241}\text{Am}$  activities were detected above the method detection limit in all samples. As shown in Table 3-2 two of the nine duplicate samples failed DER tolerances for an overall precision of 78%. Because DERs were calculated using the laboratory instrument's counting error as the only source of TPU, this overall precision is considered acceptable.

**Table 3-2 Surface Soil Duplicate Assessment – Gamma Spectroscopy Results**

Analyte	Total Real Samples Collected	Total Duplicates Collected	Number of Duplicates within DER	Overall Precision Compliance
$^{241}\text{Am}$	24	9	7	78%

#### Laboratory Alpha Spectroscopy

As indicated in this section, the precision results for  $^{241}\text{Am}$  and  $^{239/240}\text{Pu}$  did not meet the project goal of 85% compliance. However, as discussed subsequently, the precision results do not compromise the objectives of the investigation.

#### *Surface Soils*

A total of 24 real and nine duplicate surface soil samples were collected from three double sampling HPGe measurement locations and were provided to the laboratory for alpha spectroscopy analysis for  $^{241}\text{Am}$ ,  $^{239/240}\text{Pu}$ , and uranium isotopes. The frequency for duplicate sample collection for alpha spectroscopy analysis was met for this program.  $^{241}\text{Am}$  activities were detected above the method detection limit in all samples. As shown in Table 3-3 eight of the nine duplicates failed DER tolerances for  $^{239/240}\text{Pu}$  with an overall precision compliance of 11%. Five of the nine duplicates failed DER tolerances for  $^{241}\text{Am}$  with an overall precision compliance of 44%. Uranium isotopes met the project's precision compliance goal. As with the laboratory

gamma spectroscopy, DERs were calculated using the laboratory instrument's counting error as the only source of TPU.

**Table 3-3 Surface Soil Duplicate Assessment – Alpha Spectroscopy Results**

Analyte	Total Real Samples Collected	Total Duplicates Collected	Number of Duplicates within DER	Overall Precision Compliance
<sup>239/240</sup> Pu	24	9	1	11%
<sup>241</sup> Am	24	9	4	44%
<sup>233/234</sup> U	24	9	8	89%
<sup>235</sup> U	24	9	9	100%
<sup>238</sup> U	24	9	8	89%

#### *Subsurface Soils*

A total of 349 real and nineteen replicate surface and subsurface soil samples and asphalt samples were collected from boring locations and were provided to the laboratory for alpha spectroscopy analysis for <sup>241</sup>Am, <sup>239/240</sup>Pu, and uranium isotopes. The frequency for replicate sample collection (1 in 18.5) for alpha spectroscopy analysis was met for this program. As shown in Table 3-4, ten of the replicates failed DER tolerances for <sup>239/240</sup>Pu for an overall precision compliance of 44%. Six of the nineteen samples failed DER tolerances for <sup>241</sup>Am for an overall precision compliance of 68%. All uranium isotopes met the project's precision compliance goal. Again, DERs were calculated using the laboratory instrument's counting error as the only source of TPU.

**Table 3-4 Radionuclide Subsurface Soil Replicate Assessment – Alpha Spectroscopy Results**

Analyte	Total Real Samples Collected	Total Replicates Collected	Number of Replicates within DER	Overall Precision Compliance
<sup>239/240</sup> Pu	349	19	9	47%
<sup>241</sup> Am	349	19	13	68%
<sup>233/234</sup> U	349	19	19	100%
<sup>235</sup> U	349	19	19	100%
<sup>238</sup> U	349	19	18	95%

### *Discussion*

One source of the apparent imprecision of the radionuclide data may be attributed to the exclusion of sources of uncertainty beyond the instrument counting error. The DER calculation incorporates TPU that includes all uncertainties introduced from sample collection in the field through radiological analysis. However, the only uncertainty included in the TPU for this data quality assessment is the counting error at the 2-sigma level. This reduction in uncertainty in the TPU term leads to an exaggerated number of samples exceeding the DER of 1.96.

Secondly, when comparing the gamma and alpha spectroscopy DER results there appears to be an increased error associated with analyzing only an aliquot (0.25 to 2.0 grams) of the sample using alpha spectroscopy versus analyzing the entire sample (gamma spectroscopy). The overall precision for  $^{241}\text{Am}$  using gamma spectroscopy was 78% compared to 44% for alpha spectroscopy. Since the duplicate samples were collected from the same locations as the samples analyzed using gamma spectroscopy, a significant portion of difference in overall precision for  $^{241}\text{Am}$  between these two methods may be attributed to the heterogeneous distribution of  $^{241}\text{Am}$  on a small scale, as exemplified by this comparison.

This heterogeneity is also obvious by comparing the surface soil "duplicate" sample results (Table 3-3) to the subsurface soil "replicate" sample results (Table 3-4). As can be seen from the subsurface sample program, the overall precision of "replicate" samples for  $^{241}\text{Am}$  and  $^{239/240}\text{Pu}$  (47% and 68%, respectively) are higher than the overall precision of "duplicate" samples ( $^{241}\text{Am}$  at 11% and  $^{239/240}\text{Pu}$  at 44%). "Duplicate" samples were unique samples collected from adjacent locations whereas "replicate" samples for subsurface soils were splits from the same recovered core. The heterogeneous distribution of  $^{241}\text{Am}$  and  $^{239/240}\text{Pu}$  activities in surface soils is evident at these small intersample distances. Heterogeneity is also observed in the FIDLER survey results (Section 4.1.3).

Although it is clear that micro-scale heterogeneous distributions exist for  $^{241}\text{Am}$  and  $^{239/240}\text{Pu}$  activities in surface soil, the high degree of correlation between the lower precision alpha spectroscopy results and the higher precision HPGe gamma spectroscopy results indicate insignificant impact to the regression "model". With respect to subsurface soils, the distributions

of  $^{241}\text{Am}$  and  $^{239/240}\text{Pu}$  activities do not indicate patterns anomalous to those expected from the site conceptual model and/or historical data.

#### Volatile Organic Compound Analysis (EPA 8260B)

A total of 86 real and five duplicate subsurface soil samples (1 in 17.2) were collected and provided to the laboratory for analysis of VOCs. Therefore, the frequency for duplicate sample collection for VOC analysis was met for this program. Table 3-5 provides the number of samples collected under this program and the results of the RPD for the duplicate assessment. One sample pair detected VOCs in both the duplicate and associated real sample. The four other RPD calculations were conducted on sample pairs that had VOC detections in the real samples but not in the associated duplicate sample. The method detection limit was used in RPD calculations when no detections were found in the duplicate sample. Overall precision compliance for the VOC investigation was 60% where two of five duplicate sample sets were observed to exceed the RPD of 40%. Although the relative percent differences in concentrations between the real duplicate samples for each of these analytes may be significant, the detected concentrations are all well below their respective current RFCA Tier I soil action levels, i.e. because of the relatively low magnitudes of the concentrations, imprecision does not affect overall project decisions relative to VOC contamination.

**Table 3-5 Duplicate Sample Assessments – Volatile Organic Compound Analysis**

Analyte	Total Real Samples Collected	Total Duplicates Collected	Number of Duplicates within RPD	Overall Precision Compliance
PCE	86	5	3	60%
TCE	86	5	3	60%
CCL <sub>4</sub>	86	5	4	80%
1,2-DCE	86	5	3	60%

Although the overall precision compliance is less than project completeness goals, precision of the VOC results is acceptable. The apparent imprecision noted is limited to values well below the Tier I soil action levels (i.e., between detection limits and 10% of Tier I soil action levels), and, as such, does not impact project decisions relative to nature and extent of VOC contamination in the soil.

### 3.3.2 Accuracy

Accuracy is a measure of how closely an analytical or survey result corresponds to the true concentration or activity in a sample. Systematic uncertainties that affect accuracy, also known as bias, are also discussed in this section.

#### In Situ Gamma Spectroscopy

The accuracy of *in situ* gamma spectroscopy is corroborated through two methods of validation implemented for the project: systematic validation, and more importantly, performance validation, that is, through the use of comparing and correlating surface soil samples analyzed by laboratory alpha spectroscopy. The quality of the correlation, which exhibited a high correlation coefficient for linearity (Figure 2-5), validate the entire gamma spectroscopy measurement system relative to the site-specific matrix types and radiological levels of interest.

The systematic validation of gamma spectroscopy results yielded no significant qualifications to the data. Detailed technical considerations and their effects on data quality are further detailed in the Appendix C under "903 Pad In-Situ Models and Uncertainties".

Another measure of accuracy is determined by comparing the detection limit proposed to the actual detection limit reported for the sample results. Table 3-6 provides a comparison of detection limits for the *In Situ* Gamma Spectroscopy program.

**Table 3-6 Comparison of Detection Limits – In Situ Gamma Spectroscopy**

Analyte	Required Analytical Method	Required Detection Limit (pCi/g)	Actual Detection Limit (pCi/g)
<sup>241</sup> Am	<i>In Situ</i> Gamma Spectroscopy	1.0	0.38 – 1.43
<sup>235</sup> U	<i>In Situ</i> Gamma Spectroscopy	0.5	0.36 - 0.72
<sup>238</sup> U	<i>In Situ</i> Gamma Spectroscopy	5.0	1.31 – 6.49

As can be seen in Table 3-6 the lower limit of the actual detection limit was met for all three radionuclides. The required detection limit was exceeded for <sup>241</sup>Am and <sup>238</sup>U in a limited number



of analyses; however, these exceedances do not significantly impact the results of the HPGe survey nor the resulting volume estimates.

#### Laboratory Alpha Spectroscopy

The accuracy of laboratory alpha spectroscopy data was evaluated with respect to detection limits. Table 3-7 provides a comparison between required detection limits and actual detection limits.

**Table 3-7 Comparison of Detection Limits – Alpha Spectroscopy**

Analyte	Required Analytical Method	Required Detection Limit (pCi/g)	Actual Detection Limit (pCi/g)
<sup>239/240</sup> Pu	RC01B001	0.3	0.028 - 0.122
<sup>241</sup> Am	RC01B001	0.3	0.0061 - 0.168
<sup>233/234</sup> U	RC01B001	1.0	0.015 - 0.472
<sup>235</sup> U	RC01B001	1.0	0.016 - 0.472
<sup>238</sup> U	RC01B001	1.0	0.008 - 0.643

As can be seen in Table 3-7 the actual detection limit was lower than the required detection limit for all radionuclides. Therefore, accuracy from alpha spectroscopy detection limits were adequate for all sample analyses for decision making purposes.

#### Volatile Organic Compound Analysis (EPA 8260B)

The accuracy of VOC data was evaluated with respect to detection limits. Table 3-8 provides a comparison between required detection limits and actual detection limits.

The method detection limit was revised during the VOC Subsurface Investigation from the mid-level detection limit (740 ug/kg) specified in the SAP (RMRS, 1998b) to a low-level detection limit (5 ug/kg). The required detection limit of 740 ug/kg was exceeded for the target analytes in all samples from boring 96498, and in one sample each from borings 96198 and 96298. The detection limit exceedance in samples from boring 96498 was due to sample analysis using the VOA-CLP, mid level method. However, the actual detection limit is lower than the current Tier I soil action levels for VOCs and therefore did not impact decision making based on current SSALs.

**Table 3-8 Comparison of Detection Limits – Volatile Organic Compound Analysis**

Analyte	Required Analytical Method	Required Detection Limit (ug/kg)	Actual Detection Limit (ug/kg)
Carbon Tetrachloride	8260B	740	5.0 – 1500
Chloroform	8260B	740	0.1 – 1500
Cis-1,2-dichloroethene	8260B	740	0.1 – 1500
Methylene Chloride	8260B	740	1.4 – 1500
Tetrachloroethene	8260B	740	0.41 – 1500
Trichloroethene	8260B	740	0.31 – 1500

During review of the data the following biases were noted that cause the data to be qualified. Two other types of QC samples were generated in support of the VOC subsurface soil investigation; equipment rinse blanks and trip blanks. Table 3-9 provides a QC summary for methylene chloride detected in an equipment rinse blank and the associated real samples. Per EPA guidance (EPA, 1989) the methylene chloride detections in the real samples are less than ten times the detection in the associated equipment rinse blank and will be qualified as non-detect. Although trip blanks were submitted and analyzed with real samples, no qualifications were required for the associated real samples.

Methylene chloride was detected at estimated (J) concentrations in 16 samples (0.59 J to 410 J ug/Kg) at less than the method reporting limit. However, the maximum detected concentration in a method blank from the entire sample data set is 860 ug/Kg. Using EPA guidance (EPA, 1989) the concentration in the samples do not exceed ten times the maximum amount detected in any blank. Therefore, methylene chloride detections are considered a result of laboratory contamination.

Acetone was not detected in the associated rinse or method blanks in several samples from boring 97698 (99A8275), however, acetone may not be present in the sample because the continuing calibration verification criteria were not met. Acetone was detected in samples from boring 96398 (99A4102) (ranging from 1,200 up to 3,300 ug/Kg). However, the maximum detected concentration in a method blank from the entire sample data set is 670 ug/Kg. Using EPA guidance (EPA, 1989) the concentration in the samples do not exceed ten times the maximum

amount detected in any blank. Therefore, acetone detections are considered a result of laboratory contamination.

**Table 3-9 Quality Control Sample Summary**

QC Sample ID	QC Sample Type	Assoc. Real Sample(s)	Analyte(s) Detected in QC Sample	Detect in Real Samples Associated Method Blank (yes/no)	Comments
99A6650-007.002	equipment rinse blank	99A6650-002.002	Methylene chloride	no	Methylene chloride detections in field samples <10 times the detection in the QC sample. Result will be qualified as non-detect (U) (EPA, 1989).
		99A6650-003.002		no	
		99A6650-004.002		no	
		99A6650-005.002		no	
		99A6650-006.002		no	

The compound trichlorotrifluoroethane was detected in several samples from borehole 97698 (99A8275). Detections of trichlorotrifluoroethane are not considered repeatable as the dilution results for this sample indicated trichlorotrifluoroethane was no longer present. The results were assigned the J148 qualifier, as the associated value is estimated and the linear range of the measurement system was exceeded. Results were then adjusted with the dilution Contract Required Quantitation Limit and given the qualifier UD, the associated value is considered undetected at an elevated level of detection.

PCE was detected in two samples from boring 95998, at 1,540 ug/kg and 343 ug/kg with an E (estimated) qualifier. When re-analyzed by the lab the PCE results were 3,060 ug/kg and 174 ug/kg, respectively, with a D qualifier (dilution).

Qualifications of VOC data did not affect accuracy or project decision making. VOC samples were analyzed using an expedited turn-around to assist field decisions based on "Form-1's" faxed from the laboratory. Although VOC detection limits varied during the course of the project, the detection limits were lower than the current Tier I soil action levels for VOCs and therefore did not impact decision making based on these action levels.

### 3.3.3 Representativeness

Representativeness is evaluated by comparing the number and types of samples identified in the SAP with the number and type of samples actually collected. The number of samples required was based on meeting the DQOs of the characterization. Table 3-10 provides a comparison of planned samples vs. actual samples collected in support of the investigation. Table 3-11 provides a comparison of QC samples and real samples collected for the investigation.

As can be seen from Table 3-10, all areas met or exceeded planned sample requirements with the exception of the HPGe survey in the Lip Area and characterization of the asphalt and fill at the 903 Pad by alpha spectroscopy. Surface soils in the Lip Area were characterized by twenty borings completed during the subsurface radiological program. Sample results collected from the 0-6 inch interval were used to characterize surface soils in this area. Asphalt and fill samples were to be collected at all 25 boring locations within the 903 Pad. This number of samples was later determined to be excessive and the SAP was revised to include the collection of samples at nine randomly selected locations.

As can be seen from Table 3-11, the collection frequency of quality control samples was met for all analytical programs with the exception of trip blanks. Detections of VOCs in soil samples shipped without trip blanks are considered actual detections except where qualified previously as a laboratory contaminant.

### 3.3.4 Completeness

Completeness is typically expressed as a percentage, calculated as a ratio of usable results to the number of samples collected. One hundred percent of the data were verified at the project level based on comparing usable data with unusable data (RMRS, 1998c). Completeness is 100% exceeding the project's goal of 90%. Additional sampling is not required to meet the project objectives of estimating soil volumes exceeding current action levels and characterizing surface soils to 10 pCi/g <sup>241</sup>Am.

**Table 3-10 Planned vs. Actual Sample Comparison**

Area (Program)	Analysis	Planned No. of Samples (per SAP)	Actual Number of Samples Collected	Deviation	Justification
Lip Area and Americium Zone	<i>In Situ</i> Gamma Spectroscopy	1,200	1,110	-90	Borehole samples from 0 – 6 inch interval were used to characterize Lip Area east of the 903 Pad. This deviation from the SAP was approved by the agencies.
Americium Zone Surface Soils	Alpha Spectroscopy and Gamma Spectroscopy	18 from 6 FOVs	24 from 8 FOVs	+6	Collected samples from two additional FOVs for correlation of HPGe samples and field quality control locations.
903 Pad Radiological	Alpha Spectroscopy	150	107	-43	Original estimate erroneously included samples of asphalt and fill for 25 boreholes. Reduced number of fill samples to same frequency as asphalt samples. This deviation from the SAP was approved by the agencies.
903 Pad Asphalt	Alpha Spectroscopy	9	9	0	
903 Pad VOC (Subsurface VOC)	Alpha Spectroscopy	72	76	+4	Collected additional samples as a result of "stepout" borings.
903 Pad VOC	VOC	72	77	+5	Collected additional samples as a result of "stepout" borings.
903 Lip Area Radiological	Alpha Spectroscopy	100	148	+48	Collected additional samples as a result of "stepout" borings.
903 Lip Area VOC	Alpha Spectroscopy	6	9	+3	Collected additional samples as a result of "stepout" borings.
903 Lip Area VOC	VOC	6	9	+3	Collected additional samples as a result of "stepout" borings.

**Table 3-11 QC Sample Type, Quantity**

<b>Sample Type (Program)</b>	<b>Analysis</b>	<b>Number of Investigative Samples</b>	<b>Number of Duplicate/ Replicate Samples</b>	<b>Number of Rinse Blank Samples</b>	<b>Number of Trip Blank Samples</b>
Americium Zone Surface Soils (HPGe)	Alpha Spectroscopy	24	9	3	
Americium Zone Surface Soils (HPGe)	Gamma Spectroscopy	24	9	0	
903 Pad Radiological (Subsurface)	Alpha Spectroscopy	107	6	4	
903 Pad Asphalt (Subsurface)	Alpha Spectroscopy	9	1	0	
903 Pad VOC (Subsurface)	Alpha Spectroscopy	76	4	4	
903 Pad VOC (Subsurface)	VOC	77	4	3	2
903 Lip Area Radiological (Subsurface)	Alpha Spectroscopy	148	8	10	
903 Lip Area VOC (Subsurface)	Alpha Spectroscopy	9	0	0	
903 Lip Area VOC (Subsurface)	VOC	9	1	2	1
<b>Project Totals</b>	<b>Alpha Spectroscopy</b>	<b>373</b>	<b>28</b>	<b>21</b>	
	<b>Gamma Spectroscopy</b>	<b>24</b>	<b>9</b>	<b>0</b>	
	<b>VOC</b>	<b>86</b>	<b>5</b>	<b>5</b>	<b>3</b>

#### *Deviations*

Despite weather constraints and field activities conducted non-sequentially among the subsurface investigations of the 903 Pad, Lip Area, and the VOC program, quality control samples were collected at a frequency of one in 20 during the entire subsurface investigation. Trip blank samples for VOC samples were reduced to a frequency of one trip blank for every 20 real VOC samples, detections not associated with a trip blank will be considered actual detects. Two of the required VOC trip blank samples were missed. This deviation from the SAP is justifiable as the analytical data is adequate to characterize subsurface soil and thus is representative of the subsurface soil conditions. Gamma spectroscopy analysis of aqueous samples could not be performed on rinse blank water samples. Two of the VOC investigation boreholes were not completed to bedrock due to refusal of the geoprobe sampling equipment at boreholes 96798 and 97698. Data collected from these boreholes are adequate and representative of subsurface soil conditions.

#### **3.3.5 Comparability**

All results presented are comparable with historical sampling and analyses results. This comparability is based on standard methods (EPA-approved methods), systematic quality controls, and thorough documentation of the planning, sampling, and analysis process.

The comparability of two samples were questioned during the investigation. One sample from HPGe measurement location 104 at 3 meters (98A5590-001.006) was reanalyzed as sample 98A5590-004.001 because <sup>241</sup>Am results from the first analysis were elevated and not comparable to the other sample results collected at this location. One alpha spectroscopy sample result from boring 94298 (98A2014-001.002) was rejected due to the MDA exceeding the RDL. However, sample results are reported high and are comparable to other Native I soil radiological results and therefore are usable. The remaining soil samples results are comparable because consistent sample collection activities and analysis were performed in accordance with the SAP (RMRS, 1998) and procedures described in Section 2.0.

### 3.3.6 Sensitivity

Sensitivity was evaluated by comparing actual quantitation limits of the results with the regulatory or project-specific action levels required for decision-making. All analytical and radiological methods achieved adequate sensitivities based on quantitation limits well below regulatory thresholds, typically with a quantitation limit at less than 50% of the threshold.

### 3.3.7 Summary

In summary, the data sets acquired and evaluated for the 903 Pad Project were satisfactory for supporting the Data Quality Objectives proposed in the SAP. The following project objectives were achieved:

- 1) Defining actinide activities that exceed 10 pCi/g  $^{241}\text{Am}$  in surficial soils;
- 2) Defining actinide activities in surface and subsurface soil that exceed Tier I and II RSALs; and
- 3) Defining VOC concentrations in subsurface soil that exceed current Tier I SSALs.

Although not required by the SAP, an additional evaluation was performed to define VOC concentrations in subsurface soils that exceed proposed Tier I and Tier II SSALs (Kaiser-Hill, 1999b). However, proposed Tier II SSALs are below the required detection limit for VOCs identified in the SAP (Appendix D). Although subsurface soils have been characterized with respect to the proposed Tier I SSALs, not all soils have been characterized with respect to proposed Tier II SSALs. Therefore, areas exceeding proposed Tier II SSALs may be underestimated.



## **4.0 NATURE AND EXTENT OF CONTAMINATION**

The nature and extent of soil contamination related to releases from the 903 Pad has been evaluated by analysis of radionuclide and chemical data obtained as described in Section 2. The primary objective of the investigation is to determine the areal extent and depth of radiological and organic contamination above Tier I RSALs and Tier I SSALs, respectively. Another objective of the investigation was to characterize  $^{241}\text{Am}$  in surface soils to 10 pCi/g using gamma spectroscopy field instrumentation. This characterization would allow for identification of surface soils exceeding Tier II RSALs. Remedial alternatives will be evaluated in the IM/IRA decision document based on these criteria.

Detailed descriptions of contamination in surface and subsurface soil are presented in this section. Results of the HPGe survey of the Americium Zone are presented in Section 4.1. Sections 4.2 and 4.3 respectively summarize radionuclide and VOC soil data collected for the 903 Pad and Lip Area. Descriptive summary statistics of the data are presented in Appendix D. Electronic copies of analytical results and Tier I and Tier II RSAL calculations are provided in Appendix E.

### **4.1 SOIL RADIOLOGICAL CONTAMINATION IN THE AMERICIUM ZONE**

Results presented in this section are based on the double sampling technique in which HPGe measurements were correlated to alpha spectroscopy laboratory results. The linear regression between the HPGe results and laboratory results showed a high degree of correlation ( $R > 0.97$ ), and was therefore used to standardize each HPGe measurement to laboratory derived alpha spectroscopy results (see Section 2.2.2). This provided an accurate model for estimating radiological contamination in surface soil relative to Tier I and Tier II RSALs at each survey location.

#### **4.1.1 Comparison of HPGe Measurements to Tier I and Tier II RSALs**

Based on 1,110 HPGe measurements in the Americium Zone (Figure 2-1), radiological contamination appears to extend approximately 1,050 feet east of the Lip Area. Surface soil contamination is defined by Tier I and Tier II RSAL exceedances, which are summarized in Table 4-1. Using the best-fit regression model, nearly 37 % of the measurement locations exceed

the Tier II RSALs. Less than 1% of the measurement locations exceed the Tier I RSALs. HPGe results and RSAL calculations are presented in Appendix E.

**Table 4-1 Frequency of RFCA Tier I and Tier II RSAL Exceedances-HPGe Survey Results**

HPGe Survey	Number of Measurements	Number Of Exceedances RFCA Tier I RSALs	Number Of Exceedances RFCA Tier II RSALs
Surface Soil	1110	4	416

The range of measured  $^{241}\text{Am}$ ,  $^{239/240}\text{Pu}$ ,  $^{235}\text{U}$ , and  $^{238}\text{U}$  activities are presented graphically in Figure 4-1. Comparison of radionuclide results to Tier I and Tier II RSALs indicate that RSAL exceedances are due to elevated activities of  $^{239/240}\text{Pu}$  and  $^{241}\text{Am}$ . For  $^{239/240}\text{Pu}$ , activities range from 6.32 pCi/g to 938.42 pCi/g with a mean value of 105.05 pCi/g. Approximately 7% of the  $^{239/240}\text{Pu}$  measurements exceed the Tier II RSAL of 252 pCi/g. None of the  $^{239/240}\text{Pu}$  measurements exceed the Tier I RSAL of 1429 pCi/g.  $^{241}\text{Am}$  activities range from 4.91 pCi/g to 149.22 pCi/g with a mean value of 20.19 pCi/g. Approximately 10% of the  $^{241}\text{Am}$  measurements exceed the Tier II RSAL of 38 pCi/g. Like  $^{239/240}\text{Pu}$ , none of the  $^{241}\text{Am}$  measurements exceed the Tier I RSAL of 215 pCi/g. HPGe measurements for  $^{235}\text{U}$  and  $^{238}\text{U}$  were all below Tier I and Tier II RSALs.

#### **4.1.2 Spatial Distribution of Radiological Contamination in the Americium Zone**

Figure 4-2 shows the distribution of Tier I and Tier II RSAL exceedances in surface soil within the Americium Zone. The highest level of contamination as indicated by Tier I RSAL exceedances is isolated at a cluster of three locations near the northwest corner of the Americium Zone and at one location in the south central portion of the Lip Area. Tier II exceedances encompass nearly 37% of the Americium Zone Investigation Area. The HPGe data also define the extent of soil contamination by bounding the area with survey results that are below Tier II RSALs (Figure 4-2). The accuracy of the HPGe survey data is corroborated by historical data as discussed in Section 2.2.2.1. The HPGe data also indicate, as expected, noncontaminated areas where clean fill was used for the road south of the cement and wetland areas, and for the road that borders the western and northern perimeter of the Americium Zone.

The Tier I and Tier II RSAL exceedances are associated with elevated activities of  $^{239/240}\text{Pu}$  and  $^{241}\text{Am}$ . The distribution of  $^{241}\text{Am}$  activities is shown in Figure 4-3. The highest activities of  $^{241}\text{Am}$

exceed 140 pCi/g near the northwest corner of the Americium Zone. As shown, the distribution of  $^{241}\text{Am}$  Tier II RSAL exceedances trend in a northeast-southwest orientation, which extends from the southwest corner of the Lip Area to the north-central portion of the Americium Zone. The distribution of  $^{239/240}\text{Pu}$  activities in surface soil (Figure 4-4) is similar to that of the  $^{241}\text{Am}$  activities, with the highest activities exceeding 900 pCi/g near the northwest corner of the Americium Zone. The pattern of Tier I RSAL exceedances is also similar to that observed for  $^{241}\text{Am}$ , with a northeast-southwest trend of contamination. This trend is a result of contaminant deposition from the source area. The similar spatial configurations of  $^{241}\text{Am}$  and  $^{239/240}\text{Pu}$  are to be expected because  $^{241}\text{Am}$  is a daughter product of weapons grade plutonium decay.

#### 4.1.3 FIDLER Surveys

A FIDLER survey was conducted at HPGe measurement location 301 (Figure 2-1) where an isolated HPGe measurement (direct field measurement) exceeded the 10 pCi/g  $^{241}\text{Am}$  decision level. The FIDLER survey was used to determine if the result was caused by the presence of a smaller area containing a hot spot. It should be noted that all  $^{241}\text{Am}$  activities discussed in this section are presented as direct field measurements. The activity of  $^{241}\text{Am}$  from the *in situ* HPGe measurement location 301 was 10.977 pCi/g and the surrounding HPGe measurements were less than 10 pCi/g. FIDLER survey results ranged from 1,224 to 2,841 cpm with a mean of 2,056 cpm. Background measurements of 910 and 1,107 cpm for the two FIDLERs used for the survey were taken at the step-off pad on the north side of the Americium Zone, adjacent to the East Access Road. Because of the low level of  $^{241}\text{Am}$  detected in the soil and two FIDLER instruments used for the survey, the results are qualitative at best. However, contamination appears to be homogeneous as would be expected at this distant location from the source where contamination is a result of wind dispersal of plutonium contaminated soil from the 903 Pad and Lip Area.

FIDLER surveys were also conducted at HPGe locations 460 and 462 (Figure 2-1) where surface soils exceeded the RFCA Tier I RSALs. The surveys were conducted to determine whether contamination was homogeneous and widespread as suggested by the conceptual model, or heterogeneous consisting of numerous individual hot spots. The activities of  $^{241}\text{Am}$  from the *in situ* HPGe measurements were 115.74 and 109.04 pCi/g for HPGe measurement locations 460

and 462, respectively, and the surrounding HPGe measurements were less than 100 pCi/g. FIDLER survey results for HPGe measurement location 460 ranged from 2,928 to 17,039 cpm with a mean of 8,293 cpm. FIDLER survey results for FOV 462 ranged from 3,466 to 15,331 cpm with a mean of 8,729 cpm. Background measurements of 1,430 and 2,127 cpm for the two FIDLERs were taken at the step-off pad on the southwest corner of the Americium Zone, adjacent to the access road for the old firing range. Because two FIDLER instruments were used for the surveys, the results are qualitative. However, contamination appears to be heterogeneous and consists of numerous individual hot spots as might be expected from soil disturbance, localized erosional paths, or depositional areas near the source of contamination.

#### 4.2 SOIL RADIOLOGICAL CONTAMINATION IN THE 903 PAD AND LIP AREA

Surface and subsurface soil samples were analyzed for  $^{241}\text{Am}$ ,  $^{239/240}\text{Pu}$ ,  $^{233/234}\text{U}$ ,  $^{235}\text{U}$ , and  $^{238}\text{U}$  using alpha spectroscopy methods. Surface and subsurface soil samples were aggregated into four native soil horizons (Native 1 [0-6 in], Native 2 [6-12 in], Native 3 [12-18 in], Native 4 [18-24 in]), bedrock soil, and artificial fill under the 903 Pad. Artificial fill in the Lip Area was classified as Native 1 soil because native soil and artificial fill could not be differentiated in the field.

Based on the radiological results, contamination appears to be confined to the top 1.5 feet of native soil, and is most extensive in the Native 1 soil horizon. Table 4.2 summarizes the Tier I and Tier II RSAL exceedances. The frequency of Tier I and II exceedances decreases with increasing depth. No samples collected beneath the Native 3-soil horizon exceeded Tier I and Tier II RSALs<sup>2</sup>. Radiological data and RSAL SOR calculations for surface and subsurface soil are presented in Appendix E.

<sup>2</sup> Radiological sample results from the subsurface VOC investigation indicate no contamination above Tier II RSALs. Activities of all measured radionuclides from the VOC investigation were below 3 pCi/g.

**Table 4-2 Frequency of RFCA Tier I and Tier II RSAL Exceedances-Native Soil Results**

Geologic/Fill Material	Number of Measurements	Frequency Of Exceedances RFCA Tier I RSALs	Frequency Of Exceedances RFCA Tier II RSALs
Asphalt	9	N/A	N/A
Bedrock	12	0	0
Fill	12	0	1
Native	72	0	0
Native 1	62	17	34
Native 2	62	5	11
Native 3	62	0	3
Native 4	58	0	0

N/A Not Applicable; Asphalt samples were not comparable to RSALs

#### 4.2.1 Radionuclide Activities in Native Soils

The range of activities for  $^{241}\text{Am}$ ,  $^{239/240}\text{Pu}$ ,  $^{233/234}\text{U}$ ,  $^{235}\text{U}$ , and  $^{238}\text{U}$  in Native 1, Native 2, and Native 3 soil types are shown graphically in Figure 4-5. As discussed in the following subsections, the amount of contamination decreases significantly with depth.

##### 4.2.1.1 Native 1 Surface Soil Contamination

The Native 1 soil has the most extensive contamination as indicated by activities of  $^{241}\text{Am}$ ,  $^{239/240}\text{Pu}$  and  $^{231}\text{U}$  that exceed Tier I and Tier II RSALs (Table 4-2 and Figure 4-5).  $^{238}\text{U}$  activities range from 0.49 pCi/g to 780 pCi/g with a geometric mean value of 1.99 pCi/g<sup>3</sup>. The high activity of 780 pCi/g is the only exceedance above Tier I and Tier II RSALs of 586 pCi/g and 103 pCi/g, respectively. Approximately 44 percent of the  $^{239/240}\text{Pu}$  and  $^{241}\text{Am}$  results exceed Tier II RSALs.

$^{239/240}\text{Pu}$  activities range from 0.82 pCi/g to 152,260 pCi/g with a geometric mean value of 146.69 pCi/g. For  $^{239/240}\text{Pu}$ , 15% of the samples exceed the Tier I RSAL of 1,429 pCi/g and 44% of the samples exceed the Tier II RSAL of 252 pCi/g.  $^{241}\text{Am}$  activities in Native 1 soil appear

<sup>3</sup> The data appear to have a lognormal distribution, and therefore, a geometric mean is a better measure of the central tendency of the distribution.

more extensive than that of  $^{239}\text{Pu}$  with activities ranging from 0.15 pCi/g to 31,670 pCi/g. For  $^{241}\text{Am}$  activities, 19.1% of the samples exceed the Tier I (215 pCi/g) RSAL and 47.1% exceed the Tier II (38 pCi/g) RSAL.

#### 4.2.1.2 Native 2 Subsurface Soil Contamination

The Native 2 soil horizon is substantially less contaminated than the Native 1 soil horizon but still contains activities above Tier I and Tier II RSALs for  $^{241}\text{Am}$  and  $^{239/240}\text{Pu}$  (Figure 4-5).  $^{239/240}\text{Pu}$  activities range from 0.14 pCi/g to 1,820 pCi/g with a geometric mean of 8.65 pCi/g. For  $^{239/240}\text{Pu}$ , 0.03% of the samples exceed the Tier I RSAL (1,429 pCi/g) and 11% of the samples exceed the Tier II RSAL (252 pCi/g).  $^{241}\text{Am}$  activities range from non-detectable (0.03 pCi/g) to 406 pCi/g with a geometric mean value of 1.79 pCi/g.  $^{241}\text{Am}$  contamination is similar to that of  $^{239/240}\text{Pu}$  contamination as indicated by frequency of exceedances of 0.03% and 11% above Tier I (215 pCi/g) and Tier II (38 pCi/g) RSALs.

#### 4.2.1.3 Native 3 Subsurface Soil Contamination

The amount of contamination in the Native 3 soil is minimal relative to the Tier II RSALs (Figure 4-5). Only one sample for  $^{241}\text{Am}$  exceeds the corresponding Tier II RSAL of 38 pCi/g.  $^{241}\text{Am}$  in the Native 3 soil horizon ranges from non-detectable to 54.40 pCi/g with a median value of 0.23 pCi/g<sup>4</sup>. Activities of  $^{239/240}\text{Pu}$  in the Native 3 soil horizon were below the respective Tier I and Tier II RSALs.

### 4.2.2 Spatial Distribution of Contamination

Examination of the spatial distribution of contamination is useful for evaluating potential sources and contaminant migration pathways. This section discusses the spatial distribution of Tier I and Tier II RSALs for Native 1, Native 2, and Native 3 soil horizons. Also presented are the spatial distributions of  $^{239/240}\text{Pu}$  and  $^{241}\text{Am}$  activities because of their exceedance of Tier I and Tier II RSALs.

<sup>4</sup> Due to the negative activities in the data set, the median value was used as a measure of the central tendency of the distribution instead of the geometric mean.

#### 4.2.2.1 Spatial Distribution of Radionuclides in the Native 1 Soil Horizon

As shown in Figure 4-6, Tier I and Tier II RSAL exceedances ( $>1$  for the sum of ratios) in Native 1 soil are located throughout the 903 Pad and Lip Area. There is no distinct pattern to the Tier I and Tier II exceedances at the 903 Pad. Most of the southern boundary and portions of the northern boundary do not exceed Tier II RSALs. For the Lip Area, Tier I exceedances are most prevalent in the center area due east of the 903 Pad, with Tier II exceedances surrounding this area. Relatively "clean" areas as indicated by RSALs less than Tier II are located further to the east and south of the 903 Pad. Apparent spatial gaps in contamination may be explained by past remedial activities. For example, the soil in the Lip Area was graded back toward the 903 Pad during past remedial actions, and therefore the soil closest to the Pad is not as contaminated as the soil near the central portion of the Lip Area. Similar remedial activities in 1984 removed contaminated soil in the western portion of the Lip Area.

The RSAL exceedances are associated with elevated levels of  $^{239/240}\text{Pu}$  and  $^{241}\text{Am}$ . Figure 4-7 shows the distribution of  $^{241}\text{Am}$  in the Native 1 surface soil. The highest  $^{241}\text{Am}$  activities exceed 30,000 pCi/g and are centered near boring 91598 (Figure 4-7). However, as shown in Figure 4-7, the majority of the Native 1 soils in the 903 Pad (approximately half of the Native 1 soil) and Lip Area exceed the Tier II RSAL for  $^{241}\text{Am}$  of 38 pCi/g. The distribution of the  $^{239/240}\text{Pu}$  activities is similar to that of the  $^{241}\text{Am}$  activities, with the highest activities exceeding 150,000 pCi/g at boring 91598 (Figure 4-8). Like  $^{241}\text{Am}$ , the  $^{239/240}\text{Pu}$  activities are elevated with respect to the Tier II RSAL (252 pCi/g) in most of the Native 1 soil within the 903 Pad and approximately half of the Native 1 soil in the Lip Area.

#### 4.2.2.2 Spatial Distribution of Radionuclides in the Native 2 Soil Horizon

Figure 4-9 shows the distribution of the Tier I and Tier II RSAL exceedances ( $>1$  for the sum of ratios) in the Native 2 soil horizon. The RSAL exceedances are not as ubiquitous as in the Native 1 soil horizon. RSAL exceedances are isolated to an area around boreholes 91398, 91598, 91898, and 91998 at the 903 Pad and around several boreholes throughout the Lip Area (boreholes 94898, 94998, 95198, 95398, 95498, 95598, and 97598). Like the Native 1 soil horizon, RSAL exceedances in the Native 2 soil horizon are associated with elevated levels of  $^{241}\text{Am}$  and  $^{239}\text{Pu}$ .

<sup>241</sup>Am activities exceed 400 pCi/g in the 903 Lip Area with the highest activity observed at 95198 (Figure 4-10). The distribution of Pu-239 in the Native 2 soil horizon is very similar to that of <sup>241</sup>Am (Figure 4-11). <sup>239</sup>Pu exceeds 18,000 pCi/g (above the Tier I RSAL) at boring 95198. <sup>239/240</sup>Pu activities exceeding the Tier II RSAL (252 pCi/g) are distributed like the <sup>241</sup>Am activities (Figure 4-11). The <sup>239/240</sup>Pu and <sup>241</sup>Am activities in the Native 2 soil horizon are generally one to two orders of magnitude less than those observed in the Native 1 soil horizon.

Historical grading activity at the 903 Pad likely explains the somewhat different <sup>239/240</sup>Pu and <sup>241</sup>Am distributions between Native 1 and Native 2 soils. For example, grading activities at boring 91998 may have redistributed contamination in Native 1 soil leaving higher contaminated soils in the Native 2 soil horizon. In the Lip Area, the amount of artificial fill in the Native 1 soil horizon would explain higher activities in Native 2 soil relative to the Native 1 soil.

#### 4.2.2.3 Spatial Distribution of Radionuclides in the Native 3 Soil Horizon

Figure 4-12 shows the distribution of the Tier II RSAL exceedances (>1 for the sum of ratios) in the Native 3 soil horizon<sup>5</sup>. The amount of radionuclide contamination in the Native 3 soil horizon is significantly less than that in the Native 1 and Native 2 soil horizons. Tier II RSAL exceedances are isolated along the northern boundary of the Lip Area at borings 94898 and 95198. One other isolated Tier II RSAL exceedance is observed east of the 903 Pad at boring 95498. Like the Native 1 and Native 2 soil horizons, the RSAL exceedances within the Native 3 soil horizon are associated with elevated levels of <sup>241</sup>Am and <sup>239/240</sup>Pu.

As shown in Figure 4-13, elevated levels of <sup>241</sup>Am with respect to the Tier II RSAL (38 pCi/g) are observed along the northern boundary of the Lip Area at boring 94898. Another area east of the 903 Pad near boring 95498 shows relatively high activities of <sup>241</sup>Am (up to 26 pCi/g) but these activities are slightly less than the Tier II RSALs<sup>6</sup>. The spatial distribution of <sup>239</sup>Pu in the Native 3 soil horizon is similar to that of <sup>241</sup>Am, (Figure 4-14). Although none of the <sup>239/240</sup>Pu samples exceed Tier I or Tier II RSALs, the relatively high activities near borings 94898 and 95498 contribute to the Tier II RSAL exceedances at these locations.

<sup>5</sup> Tier I RSAL exceedances were not observed in the Native 3 Soil horizon.

<sup>6</sup> Tier I RSAL exceedances for <sup>241</sup>Am were not observed in the Native 3 Soil horizon.



Overall, the area of  $^{241}\text{Am}$  and  $^{239/240}\text{Pu}$  contamination decreases significantly with depth. Despite nearly identical spatial trends, the  $^{241}\text{Am}$  and  $^{239}\text{Pu}$  activities within the Native 3 soil horizon are an order of magnitude less than those within the Native 2 soil horizon.

#### 4.2.3 Radionuclide Activities in 903 Pad Asphalt and 903 Pad Artificial Fill

Asphalt samples from the 903 Pad were collected to obtain preliminary estimates of the sample variance and mean for waste characterization purposes<sup>7</sup>. Random sampling techniques were used as an appropriate method to estimate the population mean and to determine the total amount of contamination. Nine asphalt samples were collected from sample locations randomly selected from the twenty-five 903 Pad subsurface soil sampling locations as shown in Figure 4-15.

Asphalt thickness ranged from 0.4 to 0.7 feet with an average thickness of 0.5 feet.

Twelve artificial fill samples were collected from locations randomly selected from the twenty-five 903 Pad subsurface soil sampling locations as shown in Figure 4-16. Artificial fill thickness ranged from 0.3 to 0.9 feet with an average thickness of 0.5 feet beneath the 903 Pad. Artificial fill results were compared to RFCA Tier I and Tier II RSALs. Samples were analyzed for  $^{241}\text{Am}$ ,  $^{239/240}\text{Pu}$ ,  $^{233/234}\text{U}$ ,  $^{235}\text{U}$ , and  $^{238}\text{U}$ , using alpha spectroscopy methods. The descriptive summary statistics are provided in Appendix D.

##### 4.2.3.1 Radionuclide Distribution in Asphalt

The radionuclide activities in asphalt were low relative to the activities observed in the Native 1 soil horizon. As shown in Figures 4-15 and 4-17, the activities for  $^{241}\text{Am}$ ,  $^{239/240}\text{Pu}$ ,  $^{233/234}\text{U}$ ,  $^{235}\text{U}$ , and  $^{238}\text{U}$  are all below 1.5 pCi/g. The mean, standard deviation, and other descriptive statistics are summarized in Table 4-3.

Figure 4-15 shows the distribution of radionuclides in asphalt. With the exception of  $^{238}\text{U}$ , the highest radionuclide activities in asphalt are present at boring 91898 ( $^{233/234}\text{U}$  [1.13 pCi/g],  $^{235}\text{U}$  [0.133 pCi/g],  $^{241}\text{Am}$  [0.341 pCi/g], and  $^{239/240}\text{Pu}$  [1.22 pCi/g]). The highest  $^{238}\text{U}$  (0.919 pCi/g) activity in asphalt was reported at boring 90198.

<sup>7</sup> Asphalt samples were not comparable to RSALs, which are based the physical and chemical properties of soil. Instead, waste disposal WAC requirements for asphalt will be based on the mean and variance.

**Table 4-3. Descriptive Summary Statistics for 903 Pad Asphalt**

Descriptive Statistic	<sup>233/234</sup> U (pCi/g)	<sup>235</sup> U (pCi/g)	<sup>238</sup> U (pCi/g)	<sup>239/240</sup> Pu (pCi/g)	<sup>241</sup> Am (pCi/g)
Mean	0.81	0.05	0.75	0.16	0.07
Geometric Mean	0.80	0.04	0.74	N/A	0.04
Standard Error	0.05	0.01	0.04	0.13	0.03
Median	0.78	0.04	0.75	0.03	0.04
Standard Deviation	0.15	0.03	0.13	0.40	0.10
Sample Variance	0.02	0.00	0.02	0.16	0.01
Kurtosis	1.70	7.01	-1.60	8.85	8.28
Skewness	1.22	2.46	-0.08	2.97	2.84
Coefficient of Variation	0.19	0.72	0.17	2.42	1.46
Range	0.47	0.12	0.32	1.22	0.33
Minimum	0.66	0.01	0.60	0.00	0.02
Maximum	1.13	0.13	0.92	1.22	0.34
Sum	7.27	0.42	6.74	1.48	0.63
Count	9	9	9	9	9
Confidence Level (90.0%)	0.08	0.02	0.07	0.22	0.06

NA Not Applicable.

#### 4.2.3.2 Radionuclide Distribution in 903 Pad Artificial Fill

The ranges of activities for the measured isotopes in artificial fill are presented in Figure 4-17. Overall, the radionuclide activities in artificial fill are low relative to the activities observed in the Native 1, Native 2, and Native 3 soil horizons. However, one Tier II RSAL exceedance is observed within the 903 Pad Area at boring 91898 (Figure 4-16). The Tier II RSAL exceedance is associated with elevated levels of <sup>241</sup>Am (126 pCi/g) and <sup>239/240</sup>Pu (558 pCi/g), which both exceed the respective Tier II RSALs of 38 pCi/g and 252 pCi/g. <sup>241</sup>Am activities in artificial fill range from 0.02 pCi/g to 126 pCi/g with a geometric mean value of 1.18 pCi/g. Elevated activities within the artificial fill appear to be isolated around this single boring considering that the highest <sup>233/234</sup>U (2.02 pCi/g), <sup>235</sup>U (0.49 pCi/g), <sup>233/234</sup>U (2.77 pCi/g), and <sup>239/240</sup>Pu (558 pCi/g) activities were also observed at boring 91898 (Figure 4-17). Descriptive summary statistics for the 903 Pad artificial fill are presented in Table 4-4.

**Table 4-4. Descriptive Summary Statistics for 903 Pad Artificial Fill**

Descriptive Statistic	<sup>233/234</sup> U (pCi/g)	<sup>235</sup> U (pCi/g)	<sup>238</sup> U (pCi/g)	<sup>239/240</sup> Pu (pCi/g)	<sup>241</sup> Am (pCi/g)
Mean	1.06	0.09	1.15	53.75	12.01
Geometric Mean	1.02	0.06	1.00	5.78	1.18
Standard Error	0.11	0.04	0.18	45.95	10.38
Median	0.98	0.06	1.13	4.48	0.85
Mode	0.84	0.07	1.24	N/A	N/A
Standard Deviation	0.38	0.13	0.61	159.19	35.97
Sample Variance	0.14	0.02	0.37	25340.90	1294.08
Kurtosis	4.79	11.19	5.53	11.88	11.90
Skewness	1.51	3.30	1.72	3.44	3.44
Coefficient of Variation	0.36	1.43	0.53	2.96	2.99
Range	1.61	0.49	2.60	557.99	125.98
Minimum	0.41	0.00	0.17	0.01	0.02
Maximum	2.02	0.49	2.77	558.00	126.00
Sum	12.25	1.00	13.33	642.14	143.51
Count	12	12	12	12	12
Confidence Level (90.0%)	0.18	0.06	0.29	75.59	17.08
Number of Detections Above Tier I	0	0	0	0	0
Number of Detections Above Tier II	0	0	0	1	1

N/A Not Applicable

#### 4.3 SUBSURFACE SOIL VOC INVESTIGATION

Seventeen boreholes were completed to investigate VOC contamination at the 903 Pad and Lip Area, which included the original 13 boreholes and four "step-out" boreholes (Figure 4-18). Subsurface soil VOC contaminants of concern as identified in the SAP (RMRS, 1998a) include carbon tetrachloride (CCl<sub>4</sub>), PCE, TCE, and 1,2-cis-dichloroethylene (1,2-DCE). Despite the absence of DNAPLs during drilling, VOCs were detected at several boring locations. As shown in Figure 4-18, detections of CCl<sub>4</sub> ranged from 2.3 ug/kg in borehole 96698 (22.4 to 22.8 ft) up to 5.3 ug/kg in borehole 96798 (20.4 to 20.8 ft). Detections of PCE ranged from 1.1 ug/kg in borehole 97698 (8.2 to 8.6 ft) up to 6,100 ug/kg in borehole 90998 (3.8 to 4.0 ft). Detections of TCE ranged from 0.89 ug/kg in borehole 96698 (20.4 to 20.8 ft) up to 290 ug/kg in borehole 90998 (3.8 to 4.0 ft). Detections of 1,2-DCE ranged from 1.1 ug/kg in boreholes 96798 (12.5 to

12.9 ft) and 97698 (8.2 to 8.6 ft) up to 4,400 ug/kg in borehole 90998 (3.8 to 4.0 ft). In general, the majority of the VOC detections were observed in the northeastern quadrant of the 903 Pad at borings 90998, 95998, 96498, 96698, 96798, and 97698. VOC detections were also observed in the 903 Lip Area at boring 97298 and within the central portion of the 903 Pad at boring 96898. The ranges of VOC concentrations are presented in Figure 4-19.

No VOC detections were equal to or greater than the current Tier I SSALs (Table 4-5). However, proposed SSALs are 1 to 4 orders of magnitude less than the current Tier I SSALs (Table 1-2). Given the proposed SSALs, only one value (6,100 ug/kg observed at borehole 90998) exceeds the proposed Tier I SSAL for PCE (3,150 ug/kg). The VOCs that exceed the proposed Tier II SSALs include PCE, TCE, and 1,2-DCE (Table 4-5). As shown in Figure 4-18, the proposed Tier II exceedances are observed at boreholes 97698 (PCE), 96498 (PCE), 90998 (PCE, TCE, and 1,2-DCE), 95998 (PCE), and 96798 (PCE). The proposed Tier II SSAL exceedances occur within a relatively small area around monitoring well 08891. PCE is the most ubiquitous of the contaminants, occurring at five of the borings. The depth of contamination (relative to the proposed SSALs) varies from the 3.8 feet bgs at borehole 90998 to 24.6 feet bgs at borehole 95998. The proposed Tier II exceedances that occur below the water table are observed at borings 97698, 95998, and 96798.

**Table 4-5. Frequency of VOC SSAL Exceedances in Subsurface Soil.**

VOC	Number of Measurements	Number of Detections	Number Of Exceedances Current Tier I SSAL	Number Of Exceedances Proposed Tier I SSAL	Number Of Exceedances Proposed Tier II SSAL
Carbon Tetrachloride	86	3	0	0	0
PCE	86	19	0	1	7
TCE	86	7	0	0	1
1,2-DCE	32	1	0	0	1

Some of the deeper borehole samples may reflect solute (dissolved) concentrations in groundwater rather than concentrations in soil. Groundwater beneath the 903 Pad is relatively shallow with depth to water averaging approximately 19 feet below ground surface (bgs). During high flow regimes depth to water may decrease to 12 feet bgs. Therefore, it is likely that

detections of CCL<sub>4</sub>, PCE and TCE observed at depths greater than 20 feet at boreholes 96698 and 96798 may represent partitioning of VOCs between the aqueous and solid phases.

The delineation of VOC contamination was optimized during the field investigation by the "step-out" boring approach (RMRS, 1998a). This decision making process was triggered by detections of VOCs above 10 percent of the respective current Tier I SSALs at any boring location. Such levels required an additional "step-out" boring approximately 20 feet in the upgradient direction from the boring where VOCs were detected at 10 percent of the current Tier I SSALs. Detections above 10 percent of the current Tier I SSALs were observed at borings 90998 and 95998.

Borehole 90998 was completed as a shallow subsurface radiological borehole to a depth of 4.0 ft and based on field instrument readings a soil sample for VOC analysis was collected at a depth of 3.8 to 4.0 ft. As summarized above, the highest concentrations of PCE (6,100 ug/kg), TCE (290 ug/kg), and 1,2-DCE (4,400 ug/kg) were observed in borehole 90998. Concentrations of 1,2-DCE and PCE were above 10 percent of the current Tier I SSALs.

Borehole 96498 was completed to bedrock within one foot of borehole 90998 per the SAP (RMRS, 1998a) requiring completion of a shallow radiological borehole as a VOC borehole if VOCs were detected above 10 percent of the current Tier I SSALs. Similarly, borehole 95998 was completed to bedrock 20 ft in an upgradient direction west of boreholes 90998 and 96498. Detections of PCE (3,060 ug/kg), TCE (9.9 ug/kg), and 1,2-DCE (5.4 ug/kg) were observed in borehole 95998 at a depth of 5.0 to 5.6 ft. The concentrations of PCE that were observed in borehole 95998 were above 10 percent of the current Tier I SSAL. Therefore, borehole 97698 was completed in an upgradient direction 20 feet west of borehole 95998 in compliance with the SAP. Although PCE, TCE, and 1,2-DCE were detected in borehole 97698 none of the concentrations met or exceeded 10 percent of the current Tier I SSALs for the respective analytes.

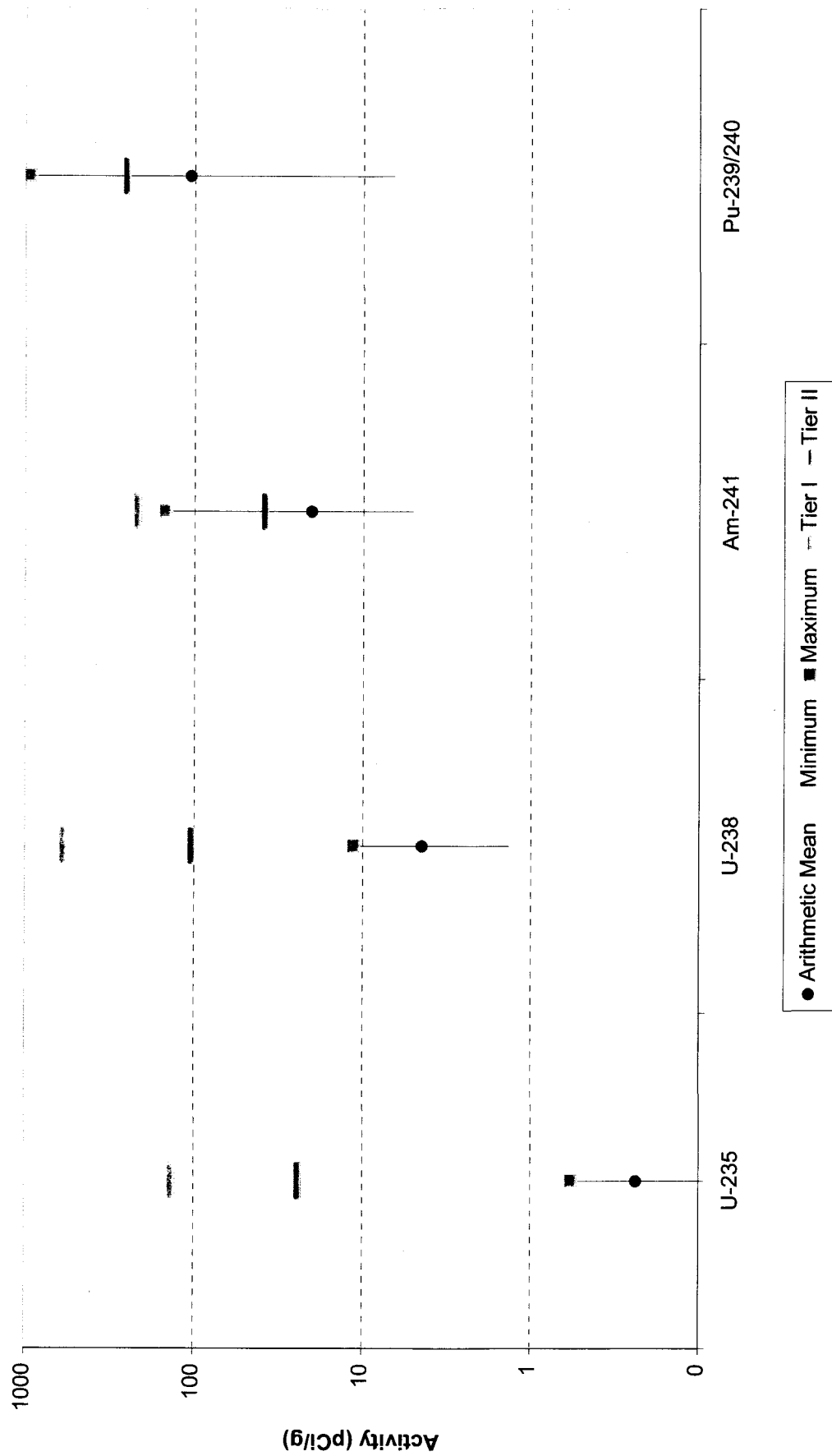
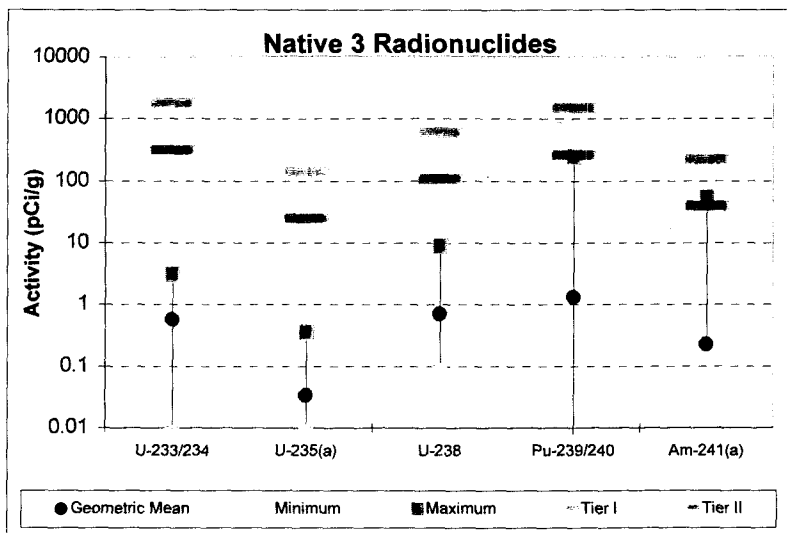
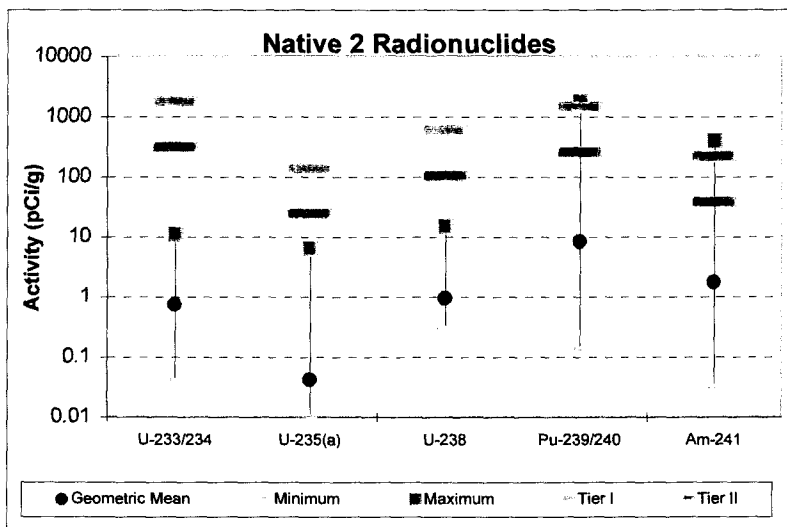
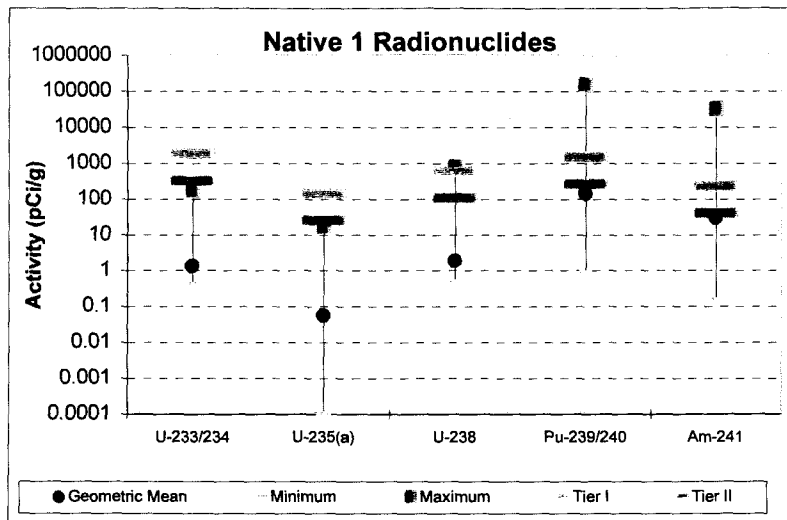


Figure 4-1 Range of Radionuclide Activities in Surface Soil - HPGe Survey



(a) Denotes median used instead of geometric mean

Figure 4-5. Range of Radionuclide Activities in Native 1, Native 2, and Native 3 Soils Horizons.

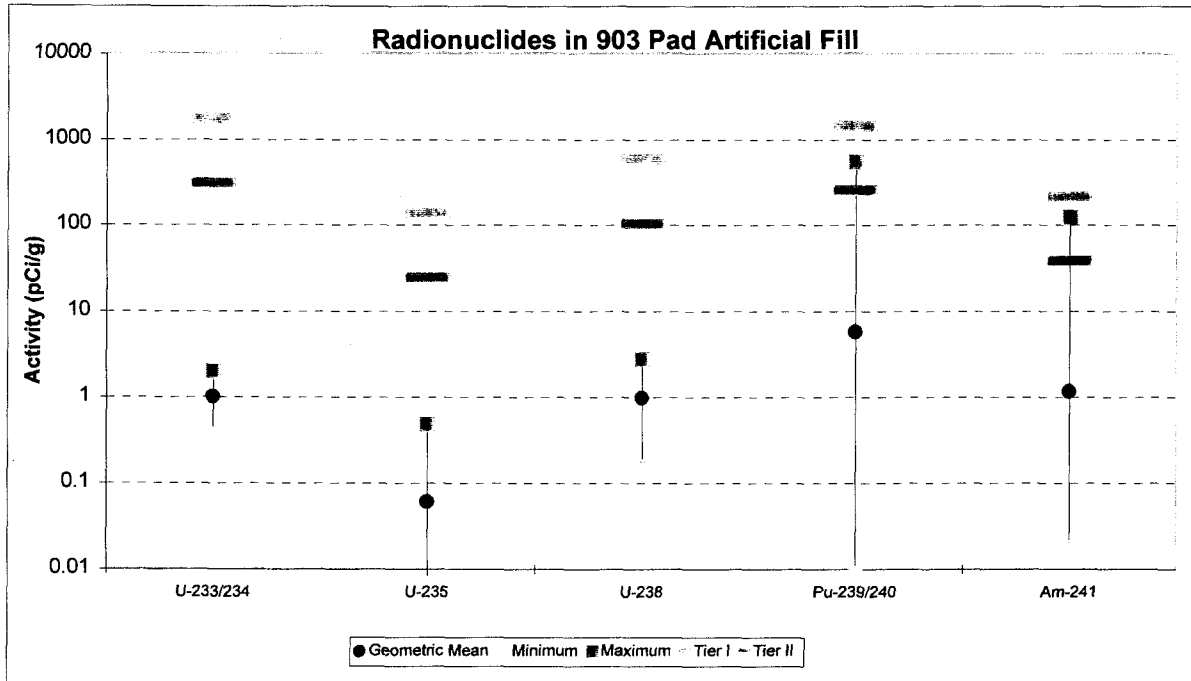
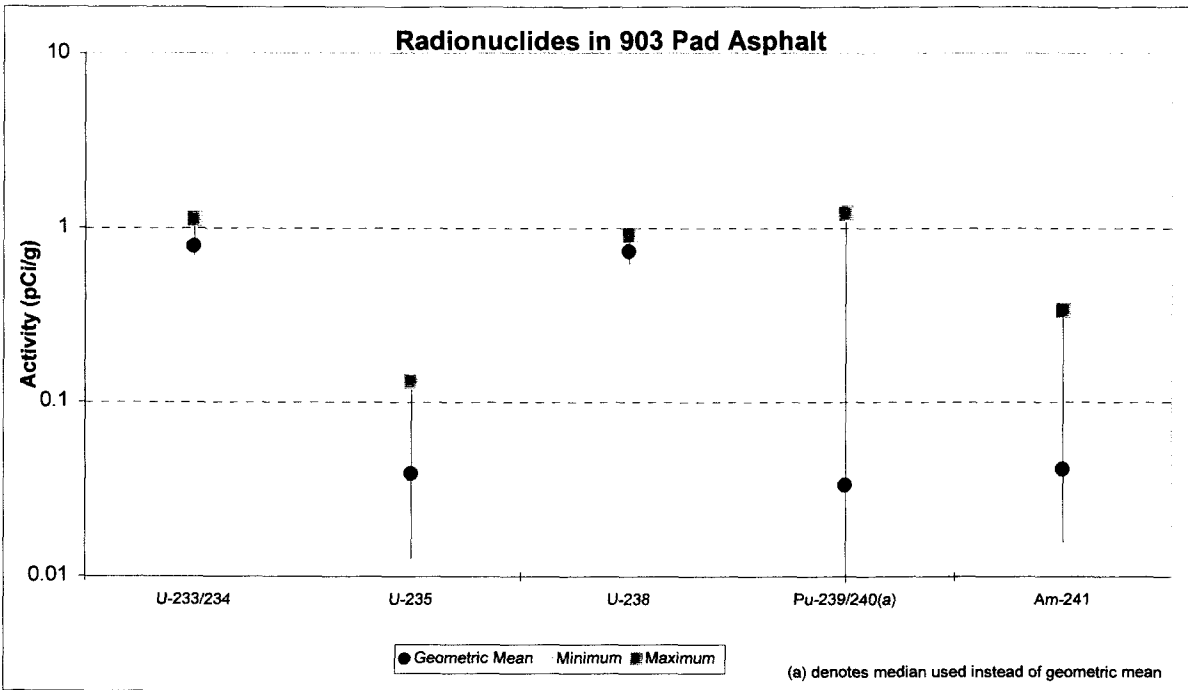


Figure 4-17. Range of Radionuclide Activities in Asphalt and Artificial Fill



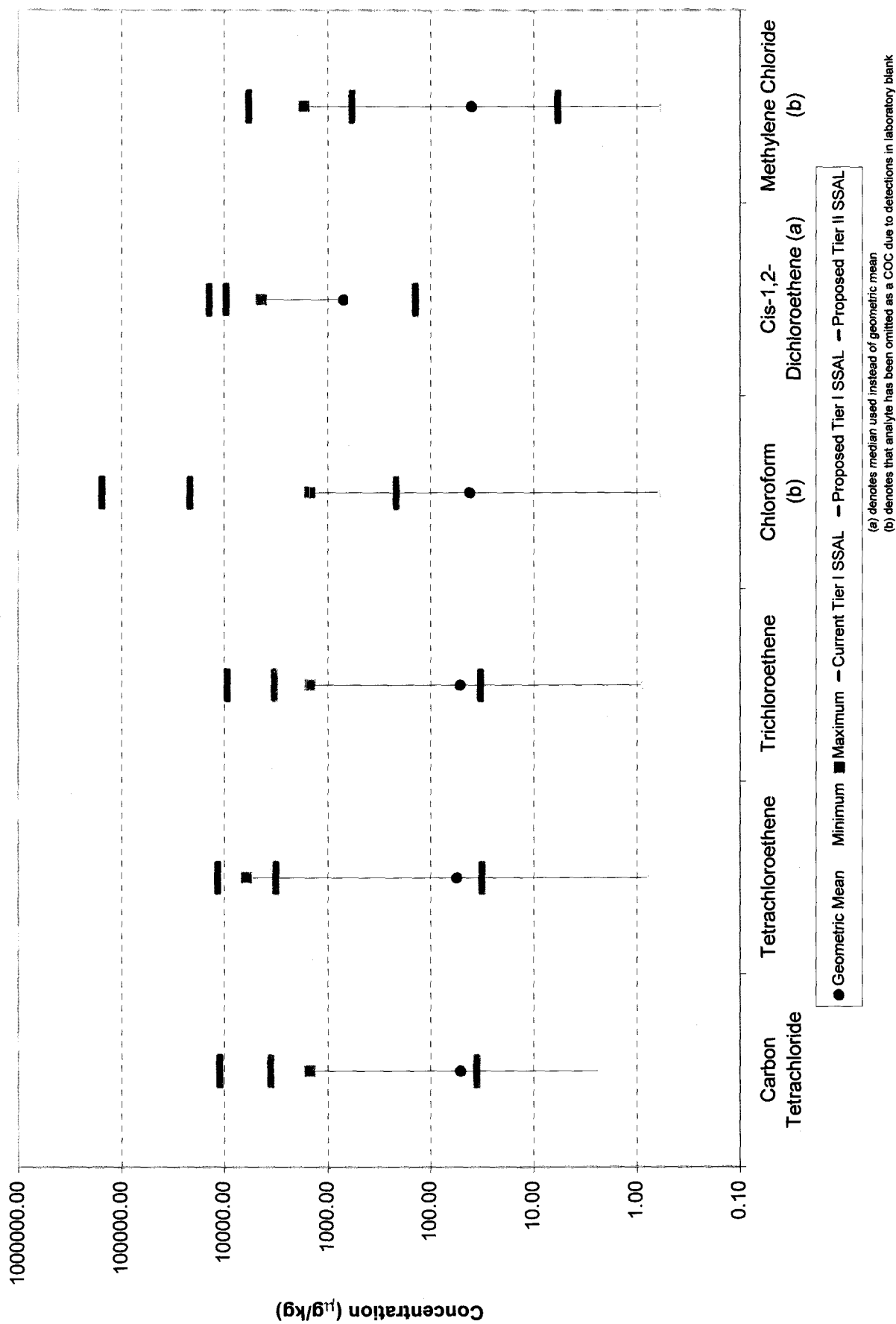


Figure 4-19. Range of VOC Concentrations in Subsurface Soil

## 5.0 CONTAMINTED MEDIA VOLUME ESTIMATES

Volume estimates of radiological and VOC contaminated surface and subsurface soil are based on the areal and vertical extent of contamination above Tier I and Tier II RSALs and proposed SSALs. An ArcInfo, version 7.2.2, Thiessen polygon command (ESRI, 1999) was used to determine areas exceeding action levels for subsequent in-place volume calculations. Remedial alternatives will be evaluated in the IM/IRA Decision Document based on these volume estimates. In-place volume estimates for the 903 Pad asphalt and artificial fill are also presented.

### 5.1 903 PAD ASPHALT AND ARTIFICIAL FILL VOLUME ESTIMATES

Characterization data for the asphalt comprising the 903 Pad were collected for waste characterization profiling, however, data were not compared to Tier I or Tier II RSALs. The estimated in-place volume of asphalt is 2,743 yds<sup>3</sup>. The estimated in-place volume of artificial fill is 2,743 yds<sup>3</sup>. The amount of radiologically contaminated artificial fill, relative to Tier II RSALs, beneath the 903 Pad is estimated at 104 yds<sup>3</sup>. The 104 yds<sup>3</sup> estimate is based on a 75 ft by 75 ft area surrounding boring 91898 and a 6 inch thickness of artificial fill. Table 5-1 summarizes the estimated areal extent, depth, and in-place volumes of asphalt and artificial fill for the 903 Pad.

**Table 5-1 Summary of 903 Pad Asphalt and Artificial Fill Volumes**

903 Pad	Depth (ft)	Area (ft <sup>2</sup> )	Volume <sup>1</sup> (ft <sup>3</sup> )	Volume <sup>1</sup> (yd <sup>3</sup> )	Volume <sup>1</sup> (m <sup>3</sup> )
Asphalt	0.5	148,104	74,052	2,743	2,097
Artificial Fill less than Tier II RSALs	0.5	142,479	71,239	2,639	2,017
Artificial Fill greater than Tier II RSALs	0.5	5,625	2,813	104	80
<b>Total</b>		<b>296,208</b>	<b>148,104</b>	<b>5,485</b>	<b>4,194</b>

<sup>1</sup>Volume represents materials in-place

## 5.2 TIER I RSAL EXCEEDANCE SOIL VOLUME ESTIMATES

A composite map of the areal extent of Tier I RSAL exceedances in soil is presented in Figure 5-1. As shown, soil with radionuclides exceeding the Tier I RSALs is located at the 903 Pad, east of the 903 Pad in the Lip Area, and sporadically in the southern portion of the Lip Area and western portion of the Americium Zone. Table 5-2 summarizes the estimated areal extent, depth, and in-place volumes of soils exceeding Tier I RSALs by IHSS. The areal extent of Native 1 radiologically contaminated surface soil (relative to Tier I RSALs) is 120,360 ft<sup>2</sup>. Depth of contamination varies from 0 to 6 inches to 0 to 12 inches throughout the investigation area. Based on the areal and vertical extent of Tier I RSAL exceedances, the total volume of in-place radiologically contaminated soil is 2,924 cubic yards (yds<sup>3</sup>). The in-place volumes of contaminated soil by IHSS are as follows: 1,268 yds<sup>3</sup> for the 903 Pad; 1,598 yds<sup>3</sup> for the Lip Area; and 58 yds<sup>3</sup> for the Americium Zone.

**Table 5-2 Summary of Radiologically Contaminated Soil Volumes-Tier I RSAL Exceedances**

903 Pad	Depth (ft)	Area (ft <sup>2</sup> )	Volume <sup>1</sup> (ft <sup>3</sup> )	Volume <sup>1</sup> (yd <sup>3</sup> )	Volume <sup>1</sup> (m <sup>3</sup> )
Native 1	0.5	62,953	31,477	1,166	891
Native 2	0.5	5,532	2,766	102	78
<b>Total</b>			<b>34,243</b>	<b>1,268</b>	<b>969</b>
<b>Lip Area</b>					
Native 1	0.5	54,288	27,144	1,005	768
Native 2	0.5	32,044	16,022	593	454
<b>Total</b>			<b>43,166</b>	<b>1,598</b>	<b>1,222</b>
<b>Americium Zone</b>					
<b>Total</b>	0.5	3,119	<b>1,560</b>	<b>58</b>	<b>44</b>
<b>Grand Total</b>			<b>78,969</b>	<b>2,924</b>	<b>2,235</b>

<sup>1</sup> Volume represents materials in-place

## 5.3 TIER II RSAL EXCEEDANCE SOIL VOLUME ESTIMATES

A composite map of the areal extent of Tier II RSAL exceedances in soil is presented in Figure 5-2. As expected, contamination above the Tier II RSALs is much more extensive than that of the Tier I RSAL exceedances. In general, Tier II RSAL exceedances encompass most of the 903

Pad, the Lip Area, and the Americium Zone. Tier II RSAL exceedances in two portions of the Lip Area extend down to the Native 3 soil horizon, a depth of 1.5 feet. Figure 5-2 shows the areal extent of the Tier II RSAL exceedances for the Native 1 (0 to 6-inch), Native 2 (6 to 12-inch), and Native 3 (12 to 18-inch) soil horizons. Table 5-3 summarizes the estimated areal extent, depth, and in-place volumes of soils exceeding Tier II RSALs by IHSS.

The areal extent of Native 1 radiologically contaminated surface soil (relative to Tier II RSALs) is 700,698 ft<sup>2</sup>. Depth of contamination varies from 0 to 6 inches to 0 to 18 inches within the investigation area. Based on the areal and vertical extent of Tier II RSAL exceedances, the total volume of in-place radiologically contaminated soil is 14,763 yds<sup>3</sup>. A depth of 6 inches was used to estimate volumes of soil in the Americium Zone. Radiologically contaminated soil volumes based on Tier II RSAL exceedances are summarized in Table 5-3. The in-place volumes of contaminated soil by IHSS are as follows: 2,471 yds<sup>3</sup> for the 903 Pad, 5,267 yds<sup>3</sup> for the Lip Area; and 7,025 yds<sup>3</sup> for the Americium Zone.

**Table 5-3 Summary of Radiologically Contaminated Soil Volumes-Tier II RSAL Exceedances**

903 Pad	Depth (ft)	Area (ft <sup>2</sup> )	Volume <sup>1</sup> (ft <sup>3</sup> )	Volume <sup>1</sup> yd <sup>3</sup> )	Volume <sup>1</sup> (m <sup>3</sup> )
Native 1	0.5	111,676	55,838	2,068	1,581
Native 2	0.5	21,738	10,869	403	308
<b>Total</b>			<b>66,707</b>	<b>2,471</b>	<b>1,889</b>
<b>Lip Area</b>					
Native 1	0.5	209,689	104,845	3,883	2,969
Native 2	0.5	52,790	26,395	978	747
Native 3	0.5	21,941	10,971	406	311
<b>Total</b>			<b>142,211</b>	<b>5,267</b>	<b>4,027</b>
<b>Americium Zone</b>					
<b>Total</b>	0.5	<b>379,333</b>	<b>189,667</b>	<b>7,025</b>	<b>5,371</b>
<b>Grand Total</b>			<b>398,585</b>	<b>14,763</b>	<b>11,287</b>

<sup>1</sup> Volume represents materials in-place

#### 5.4 SSAL EXCEEDANCE SOIL VOLUME ESTIMATES

VOC contaminants of concern ( $\text{CCl}_4$ , PCE, 1,2-DCE, and TCE) did not exceed the current Tier I SSALs. However, as discussed in Section 4.3, PCE exceeds the proposed Tier I SSAL in boring 90998 (Figure 4-18). Proposed Tier II SSAL exceedances for PCE were also observed in five borings east of well 08891. 1,2-DCE exceeds the proposed Tier II SSAL in boring 90998. The areal extent of contamination was bounded one-half the distance between adjacent borings where VOC results were below their respective SSALs, and by the edge of the 903 Pad to the east. Several proposed Tier II SSAL exceedances were observed below the water table (average depth to water is 19 feet bgs) at boreholes 95998, 96798, and 97698. VOC contamination below the water table will be addressed under the groundwater program.

##### 5.4.1 Tier I SSAL Exceedance Soil Volume Estimates

A composite map showing the areal extent of contamination as defined by the proposed Tier I SSALs is presented in Figure 5-3. The depth of VOCs that exceed proposed Tier I SSALs is assumed to extend from the natural soil surface below the top of the asphalt to 4.0 feet bgs (a thickness of 3.0 feet). This is a conservative assumption given that VOC samples were not collected above the four-foot sample interval. Based on the areal extent of the Tier I SSAL exceedances ( $5,017 \text{ ft}^2$ ) and a thickness of 3.0 feet, the total in-place volume of contaminated soil is  $558 \text{ yds}^3$  (Table 5-4).

**Table 5-4 Summary of Radiologically Contaminated Soil Volumes – SSAL Exceedances**

Area/Volume	Volume <sup>1</sup> of Soils Greater Than Current Tier I SSALs ( $\text{yds}^3$ )	Volume <sup>1</sup> of Soils Greater than Proposed Tier I SSALs ( $\text{yds}^3$ )	Volume <sup>1</sup> of Soils Greater than Tier II SSALs ( $\text{yds}^3$ )
Area with Soils Greater than Tier I and II SSALs	0	93	138
Area with Soils Less than Tier II SSALs	0	465	3,428
<b>Total</b>	<b>0</b>	<b>558</b>	<b>3,566</b>

<sup>1</sup> Volume represents materials in-place volume.

#### **5.4.2 Tier II SSAL Exceedance Soil Volume Estimates**

A composite map showing the areal extent of contamination as defined by the proposed Tier II SSALs is presented in Figure 5-3. The areal extent of proposed Tier II SSAL contamination is slightly more extensive than that of Tier I SSAL contamination. The depth of VOCs that exceed Tier II SSALs is assumed to extend from the natural soil surface below the asphalt to 13.9 feet bgs (a thickness of 12.9 feet). This includes natural soils from the 1 foot to 4 foot interval where samples were not collected. Based on the areal extent of the Tier II SSAL exceedances (7,464 ft<sup>2</sup>) and a thickness of 12.9 feet, the total in-place volume of contaminated soil is 3,566 yds<sup>3</sup> (Table 5-4).

#### **5.5 RSAL AND SSAL EXCEEDANCE SOIL VOLUME ESTIMATES**

Two areas within the 903 Pad contain surface soil with elevated levels of both radionuclides (RSALs) and VOCs (SSALs). Soil exceeding proposed SSALs occur in the two areas shown in Figure 5-3. Soil exceeding Tier I and Tier II RSALs are provided in Figures 5-1 and 5-2, respectively. Comparing these figures with Figure 5-3 shows that there are areas where both RSALs and SSALs exceedances overlap. Proposed Tier I SSAL exceedances in natural soils occur to a depth 4.0 feet. Tier I (and consequently Tier II) RSAL exceedances in natural soils are present to a depth of 6 inches in this area. Therefore, an estimated total of 93 yds<sup>3</sup> ( $[5,017 \text{ ft}^2 \times 0.5 \text{ ft}] / 27 \text{ ft}^3/\text{yd}^3$ ) of soils exceed both Tier I (and II) RSALs and proposed Tier I SSALs.

Proposed Tier II SSAL exceedances in natural soils occur to a depth 13.9 feet. Tier I (and consequently Tier II) RSAL exceedances in natural soils are present to a depth of 6 inches. Therefore, an estimated total of 138 yds<sup>3</sup> ( $[7,464 \text{ ft}^2 \times 0.5 \text{ ft}] / 27 \text{ ft}^3/\text{yd}^3$ ) of soils exceed both Tier I and II RSALs and proposed Tier II SSALs.

#### **5.6 SSAL EXCEEDANCE SOIL VOLUME ESTIMATES (NON-RADIOLOGICALLY CONTAMINTED)**

This section provides volume estimates of VOC contaminated soil (relative to SSALs) below the Native 1 soil horizon where radiologically contaminated soil (relative to RSALs) is not present.

The total in-place soil volume estimates, therefore, excludes the radiologically contaminated Native I soil addressed in Sections 5.2 and 5.3.

Soil exceeding SSALs occur in two areas within the 903 Pad (Figure 5-3). Proposed Tier I SSAL exceedances in natural soils occur to a depth 4.0 feet below the top of asphalt. Therefore, excluding the upper 1.5 feet of radiologically contaminated soil, the artificial fill and the asphalt (2.5 foot depth interval), a total of 465 yds<sup>3</sup> ( $[5,017 \text{ ft}^2 \times 2.5 \text{ ft}] / 27 \text{ ft}^3/\text{yd}^3$ ) of soil is estimated to exceed Tier I SSALs.

Proposed Tier II SSAL exceedances in natural soils occur to a depth of 13.9 feet below the top of asphalt. Excluding the upper 1.5 feet of radiologically contaminated soil, the artificial fill and the asphalt (12.4 foot depth interval), a total of 3,428 yds<sup>3</sup> ( $[7,464 \text{ ft}^2 \times 12.4 \text{ ft}] / 27 \text{ ft}^3/\text{yd}^3$ ) of soil is estimated to exceed Tier II SSALs.

## 5.7 SUMMARY OF MEDIA VOLUME ESTIMATES

This section summarizes volume estimates of soils exceeding Tier I and Tier II RSALs and SSALs, and includes 903 Pad asphalt and artificial fill volume estimates. Table 5-5 presents volumes of asphalt, artificial fill and soil exceeding Tier I RSALs and SSALs.

**Table 5-5 Volumes of Asphalt, Artificial Fill and Soils Exceeding Tier I RSALs and SSALs**

Area/Material	Exceedance	Volume <sup>1</sup> (ft <sup>3</sup> )	Volume <sup>1</sup> (yd <sup>3</sup> )	Volume <sup>1</sup> (m <sup>3</sup> )
903 Pad Soil	RSAL	34,243	1,268	969
903 Pad Soil	SSAL	12,573	465	355
Lip Area Soil	RSAL	43,166	1,598	1,222
Americium Zone Soil	RSAL	1,560	58	44
<b>Total</b>		<b>91,512</b>	<b>3,389</b>	<b>2,590</b>
903 Pad Asphalt	NA	74,052	2,743	2,097
903 Pad Artificial Fill	None	74,052	2,743	2,097
<b>Grand Total</b>		<b>239,616</b>	<b>8,875</b>	<b>6,784</b>

<sup>1</sup>Volume represents materials in-place  
NA = Not Applicable.

Table 5-6 presents volumes of asphalt, artificial fill and soil exceeding Tier II RSALs and SSALs.

**Table 5-6 Volumes of Asphalt, Artificial Fill, and Soils Exceeding Tier II RSALs and SSALs**

Area/Material	Exceedance	Volume <sup>1</sup> (ft <sup>3</sup> )	Volume <sup>1</sup> (yd <sup>3</sup> )	Volume <sup>1</sup> (m <sup>3</sup> )
903 Pad Artificial Fill	RSAL	2,813	104	80
903 Pad Soil	RSAL	66,707	2,471	1,889
903 Pad Soil	SSAL	92,556	3,428	2,620
Lip Area Soil	RSAL	142,211	5,267	4,027
Americium Zone Soil	RSAL	189,667	7,025	5,371
<b>Total</b>		<b>493,954</b>	<b>18,295</b>	<b>13,987</b>
903 Pad Asphalt	NA	74,052	2,743	2,097
903 Pad Artificial Fill <sup>2</sup>	None	71,239	2,639	2,017
<b>Grand Total</b>		<b>639,245</b>	<b>23,677</b>	<b>18,101</b>

<sup>1</sup>Volume represents materials in-place

<sup>2</sup>Excludes 104 yd<sup>3</sup> exceeding RSALs



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Document Number: RF/RMRS-99-427.UN  
Revision: 0  
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Page: 108 of 109

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## Appendix A

### Boring Logs

Best Available Copy

## ROCKY FLATS PLANT BOREHOLE LOG

PAGE 1 OF 1

Borehole Number: BH90098  
 Location - North: 749212 East: 2085611  
 Date: 3/27/98  
 Geologist: R. KOEHLER  
 Drilling Equip.: GEOPROBE

Surface Elevation: 5978 ft.  
 Area: 903 PAD/LIP near 8/25/98  
 Total Depth: 3.5 ft.  
 Company: TIERRA Project No.: GE600000  
 Sample Type: CONTINUOUS CORE

EG&amp;G LOGGING SUPERVISOR

APPROVAL

Mark WoodDATE 8/25/98

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL (FIELD MEASUREMENT)	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	SOIL/ LITHOLOGIC LOG	SAMPLE DESCRIPTION
Box 1 of 1 0.0-3.5 ft	Run #1 0.0-3.5 ft	Recovery 3.1 ft.	1.001	12:38				0.5		GC-0.6 Asphalt, black, fractured, with green, unburnt at base.
			1.002	12:38			GP	0.6		0.6-1.0 ft. Fill; Sand and Gravel, yellowish brown (10YR 5/6), rounded gravel up to 1.5 cm, fine to coarse sand, non-silicate, moist
			1.003	12:39				1.0		
			1.004	12:39						
			1.005	12:36			GC	1.5		1.0-3.1 ft. Soil: Clay, sand, gravel, mostly clay/gravel; mottled dark reddish brn (2.5YR 3/4) with spots of very dark grayish brn (10YR 3/2) and yellowish brown (10YR 5/6), gravel up to 3 cm, fractured, gravel concentrated at top and near base (clayey middle), gravel commonly rotten - composed of igneous rock frags, clay firm, plastic, moist.
			1.006	12:36				2.0		
			1.007	12:33				2.5		
			1.008	12:33				3.0		
			1.009	12:31				3.1		
			1.010	12:31				3.5		No recovery 3.1-3.5
								4.0		T.D. = 3.5 ft.
								5.0		
								6.0		
								7.0		
								8.0		
								9.0		

NOTES: General: USCS is modified for this log as follows:

Materials amounts are estimated by % volume instead of % weight.

(1) Badly broken core, accurate footage measurements not possible.

(2) Core breaks cannot be matched, accurate footage measurements not possible.

## ROCKY FLATS PLANT BOREHOLE LOG

PAGE 1 OF 1

Borehole Number: BH90198  
 Location - North: 749214 East: 2085686  
 Date: 4/21/98  
 Geologist: R. KOEHLER  
 Drilling Equip.: GEOPROBE

Surface Elevation: 5977  
 Area: 903 PAD/LIP  
 Total Depth: 4.0ft 8/25/98  
 Company: TIERRA Project No.: GE600000  
 Sample Type: CONTINUOUS CORE

EG&amp;G LOGGING SUPERVISOR

APPROVAL Mark WoodDATE 8/25/98

TOP OF CORE IF BOX	TOP OF CORE IF BOX	INTERVAL OF FEET OF CORE IN INTERVAL (FIELD MEASUREMENT)	SAMPLE NUMBER	FRACURE ANNE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	SOIL/ LITHOLOGIC LOG	SAMPLE DESCRIPTION
Box 1 of 1 0.0-4.0ft	Run #1 0.0-4.0ft	Recovery 2.9ft.	001							0.0-0.5 ft, Asphalt, black, fractured, gravel to 1.5cm rounded, membrane present.
			002		10:38		NA		NA	
			003	0.95				0.5		
			004	0.9	10:40		GM	0.9		0.5-0.9 ft, FILL, sand and gravel, light olive brown, (2.5/5/6), gravel up to 1.5cm, rounded and fractured.
			005		10:51		GC	1.0		
			006	1.4				1.4		0.9-2.9 ft, soil, unconsolidated, moist.
			007					1.5		
			008		10:48			1.9		clay sand gravel, 0.9-1.5 very dark gray (5YR 3/1) 1.5-2.9 yellowish red (5YR 5/8)
			009	1.9				2.0		gravel up to 3cm, fractured, granite and
			010		10:44			2.5		quartzites well graded, firm but crumbly, slightly moist.
			011	2.4				2.5		
			012	2.9	10:42			3.3		
								3.5		2.9-4.0ft No Recovery
								4.0		T.D. = 4.0ft.

NOTES General: USCS is modified for this log as follows:

Materials amounts are estimated by % volume instead of % weight.

(1) Badly broken core, accurate footage measurements not possible.

(2) Core breaks cannot be matched, accurate footage measurements not possible.

## ROCKY FLATS PLANT BOREHOLE LOG

PAGE 1 OF 1

Borehole Number: BH 90293  
 Location - North: 749211 East: 2085761  
 Date: 02/3/98  
 Geologist: J. Boylan  
 Drilling Equip.: Geoprobe

Surface Elevation: 5977 ft  
 Area: 903 Pad  
 Total Depth: 3.6 ft  
 Company: Tierra Project No.: GE600000  
 Sample Type: Continuous core

EG&amp;G LOGGING SUPERVISOR

APPROVAL M. WordDATE 2/23/98

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL (FIELD MEASUREMENT)	CORE SAMPLE NUMBER	FRAC- TURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	SOIL/ LITHOLOGIC LOG	SAMPLE DESCRIPTION
0.0	0.0	0.0	0.0				PT?	0.0		Asphalt - dry, chippy, crumbly. Contains fibrous geomembrane.
			0.5				SM	0.5		Sand fill - sl. moist. Traces gravel (fine). Dark brown (10YR 3/3). Bottom contact blurred.
			0.8				SM	0.8		
			0.01/003 RS 0.01/004 R					1.0		Gravelly, sandy silt w/ clay to sand-silt-clay mixture w/ gravel - Very dark brown (10YR 2/2), to dark brown (7.5YR 3/2, 3/3) below 1.8'. Increasing calcine below 2.6 brings color to v. pale brown (10YR 7/4). sl. moist throughout. Evident of activity (FIDLER) @ 0.8-1.1'.
			0.01/005 RS 0.01/006 R					1.7		
			0.01/007 RS 0.01/008 R					2.0		
			2.4 0.01/009 RS 0.01/010 R					2.4		
			0.01/011 RS 0.01/012 R					3.0		
			3.0 N/A					3.0		
3.6	3.6	3.6						3.6		NO RECOVERY 3.0 - 3.6'
								4.0		
								5.0		
								6.0		
								7.0		
								8.0		
								9.0		
								10.0		

NOTES: General: USCS is modified for this log as follows:

Materials amounts are estimated by % volume instead of % weight.

(1) Badly broken core, accurate footage measurements not possible.

(2) Core breaks cannot be matched, accurate footage measurements not possible.

RS = rad screen  
R = rad s

123

## ROCKY FLATS PLANT BOREHOLE LOG

PAGE 1 OF 1Borehole Number: BH90398Surface Elevation: 5976 ft.Location - North: T49.215 East: 2085835Area: 903 PAD/LTPDate: 4/21/98Total Depth: 4.0 ft.Geologist: R. KOEHLERCompany: TIERRA Project No. GE600000Drilling Equip.: GEOPROBE / MACROCORESample Type: CONTINUOUS CORE

EG&amp;G LOGGING SUPERVISOR

APPROVAL Mark WoodDATE 6/25/98

FORMATION OF CORE BOX	TOP OF CORE OF INTERVAL	FEET OF CORE IN INTERVAL MEASUREMENT	SAMPLE NUMBER	FLUORESCENCE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	SOIL LITHOLOGIC LOG	SAMPLE DESCRIPTION
Box 1 of 1 0.0-4.0 ft	Run #1 0.0-4.0 ft	Recovery 3.2 ft.	011	13:30	4/22/98		NA	0.0	NA	0.0-0.4 Asphalt black, fractured = brittle, gravel up to 1 cm, rounded, membrane present.
			012	0.4			GM	0.4		
			013	13:33				0.5		0.4-0.8, FILL, Olive Brown (2.5Y 4/4), sand and gravel olive brown (2.5Y 4/4), gravel to 1.5 cm rounded, c/s sand,
			014	0.8			GC	0.8		
			001	13:11	4/21/98			1.0		0.8-3.2, Soil, clay, sand, (unconsolidated, moist, gravel, 0.8-1.4 ft Very dark grayish brown (10YR 3/2), 1.4-3.2 ft brownish yellow (10YR 6/6), gravel up to 3 cm fractured, gravel composed of quartzites and metamorphic rock frags, gravel and sand micaceous in part, fine to medium sands, well graded, generally firm and but unconsolidated, moist.
			002	1.3				1.3		
			003	13:28				1.5		
			004	1.8				1.8		
			005	13:06				2.0		
			006	2.3				2.3		
			007	13:24				2.5		
			008	2.8				2.8		
								3.0		
								3.2		
								3.5		No Recovery 3.2-4.0 ft.
								4.0		
			009	RS - Rns	40 ml	13:18				T.D. = 4.0 ft
			010	R - Rns	1 gal	13:18				

NOTES: General: USCS is modified for this log as follows.

Materials amounts are estimated by % volume instead of % weight.

(1) Badly broken core, accurate footage measurements not possible.

(2) Core breaks cannot be matched, accurate footage measurements not possible.



## ROCKY FLATS PLANT BOREHOLE LOG

PAGE 1 OF 1

Borehole Number: BH90498  
 Location - North: 749216 East: 2085910  
 Date: 5/5/98  
 Geologist: R. KOEHLER  
 Drilling Equip.: GEOPROBE/MACROCORE

Surface Elevation: 5975 ft  
 Area: 903 PAD/LIP MW  
 Total Depth: 4.0 ft 8/25/98  
 Company: TIERRA Project No.: GE600000  
 Sample Type: CONTINUOUS CORE

EG&amp;G LOGGING SUPERVISOR

APPROVAL

Mark Ward

DATE

8/25/98

TOP/BOTTOM OF CORE REBOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE INITIAL FIELD MEASUREMENT	SAMPLE NUMBER	FLUORESCENCE ANALYSIS	DEFINING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	SOIL/ LITHOLOGIC LOGS	SAMPLE DESCRIPTION
Box 1 of 1 0.0-4.0 ft.	Run # 1 0.0-4.0 ft.	Recovery 2.8 ft.	001	07			NA	0.0		0.0-0.5; Asphalt, black, brittle, fractured, gravel up to 2 cm, rounded, membrane at 0.1 ft.
			002	12:51			GM	0.5		0.5-0.7: Fill; Sand and Gravel; Brownish yellow (PYR 6/6)
			003	1.2			GC	0.7		0.7-2.8: Soil; Gravel up to 1.5 cm, rounded, granitic and metamorphic rock fragments, clay, sand, gravel
			004	12:49				1.0		Coarse sand, partly granitic, unconsolidated, moist.
			005	1.7				1.2		top is dark brown
			006	12:46				1.5		to very dark grayish brown (PYR 3/3 to 3/2), bottom 0.5 ft
			007	2.2				1.7		is dark brown (10YR 4/3), gravel up to 3 cm, fractured,
			008	12:44				2.0		quartz (crystalline) and rotten granite, fine sand, firm, unconsolidated, moist.
				2.7				2.2		
				2.7				2.5		
				2.7				2.8		
				2.7				3.0		
								3.5		No Recovery 2.8-4.0 ft.
								4.0		
								4.5		T.D. = 4.0 ft.
								5.0		
								5.5		
								6.0		
								6.5		
								7.0		
								7.5		
								8.0		
								8.5		
								9.0		
								9.5		

NOTES: General: USCS is modified for this log as follows:

Materials amounts are estimated by % volume instead of % weight.

(1) Badly broken core, accurate footage measurements not possible.

(2) Core breaks cannot be matched, accurate footage measurements not possible.

## ROCKY FLATS PLANT BOREHOLE LOG

PAGE 1 OF 1

Borehole Number: BH 90598  
 Location - North: 749137 East: 2085610  
 Date: 3/27/98  
 Geologist: R. KOEHLER  
 Drilling Equip.: GEOPROBE

Surface Elevation: 5979 ft.  
 Area: 903 PAD / LTP and 8/5/98  
 Total Depth: 3.5 ft.  
 Company: TIERRA Project No. GE600000  
 Sample Type: CONTINUOUS CORE

EG&amp;G LOGGING SUPERVISOR

APPROVAL

Mark Wood

DATE

8/25/98

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL (FIELD MEASUREMENT)	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	SOIL/ LITHOLOGIC LOG	SAMPLE DESCRIPTION
Box 1 of 1 0.0-3.5 ft.	Run # 1 0.0-3.5 ft.	Recovery 2.7 ft.						0.5		0.0-0.7 Asphalt black, brittle fractured
								0.7		
			1.001	1.1			GP	1.0		0.7-1.1 ft. Fill: Sand and Gravel, gravel up to 1 cm, sub- round, igneous rock frags, fine to coarse sand, angular
			1.002	10:30				1.1		
			1.003	1.6			GC	1.5		1.1-2.7 ft. Clay, sand, gravel; dominantly dark reddish brown (SYR 3/3) one patch (1.3-1.5 ft) very dark gray (SYR 3/1), gravel up to 3 cm, igneous rock frags (granitic), commonly rotten, clay - firm, plastic, moist.
			1.004	10:38				2.0		
			1.005	2.1				2.5		
			1.006	10:26				2.7		
			1.007	2.6				3.0		
			1.008	10:23				3.5		
				3.1						No Recovery 2.7-3.5 ft.
								4.0		T.D. = 3.5 ft.
								5.0		
								6.0		
								7.0		
								8.0		
								9.0		

unconsolid.  
lt. olive b.  
2.5Y 5/6

NOTES: General: USCS is modified for this log as follows:

Materials amounts are estimated by % volume instead of % weight.

(1) Badly broken core, accurate footage measurements not possible.

(2) Core breaks cannot be matched, accurate footage measurements not possible.

PAGE 1 OF 1

Surface Elevation: 5978 ft.  
Area: 903 Pad  
Total Depth: 3.5 ft  
Company: Tierra Project No.: GE600000  
Sample Type: Continuous Core

APPROVAL M. Wood

DATE 2/23/98

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL (FIELD MEASUREMENT)	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	SOIL LITHOLOGIC LOG	SAMPLE DESCRIPTION
0.0	0.0	0.0	003/025 R 003/031 R				PT?	0.0		Aggrait - dry, chippy, crumbly; contains fibrous glomembrane.
			003/026 RS 003/032 R				SM	0.5		Sand fill - dark yellowish brown (10YR 4/4) sl. moist, trace gravel. Elevated FIDLER activities (to 15000) & base - see notes below.
			003/027 RS 003/033 R				SM GM	1.0		Gravelly silt-sand mixture - v. dark brown (10YR 3/2) sl. moist elevated FIDLER @ top - see notes below. To about brown (10YR 3/3) below 1.3'.
			003/028 RS 003/034 R				GM	1.7		Silty sand-gravel-caliche mixture - mottled colors w/ most caliche @ 1.7-2.1'; decreasing grad-ally below that. sl. moist. Colors are v. pale brown (10YR 8/4) in upper portion prominently, and streaks topals of strong brown (7.5YR 5/6) @ bottom.
			003/035 R					2.0		
			N/A					3.0		NO RECOVERY 2.8-3.5'
								3.5		
								4.0		
								5.0		
								6.0		
								7.0		
								8.0		
								9.0		
								10.0		

Box 1 of 1  
0.0-3.5'

Run  
1:  
0.0-  
3.5'

2.8

TD=3.5' (most core included  
in samples)

RS = rad screen  
R = rad

Existence of elements: FIDK endings  
 uncertain due to 0.0. inherent error.  
 @ FIDK has errors 2.2% inherent error.  
 Best estimate either 0.8% or 2.2% ± 2%  
 not possible. or both (Estimate of error)

with some red hair - eyes - still

## ROCKY FLATS PLANT BOREHOLE LOG

PAGE 1 OF 1

Borehole Number: BH 90798  
 Location - North: 249137 East: 2085760  
 Date: BH 90798 2/11/98  
 Geologist: J. B. R. KOEHLER  
 Drilling Equip.: Geoprobe

Surface Elevation: 5977 ft  
 Area: 903 Paad  
 Total Depth: 3.6 ft  
 Company: Tierra Project No.: GE600000  
 Sample Type: Continuous core

EG&amp;G LOGGING SUPERVISOR

APPROVAL M. WardDATE 2/23/98

## SAMPLE DESCRIPTION

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL (FIELD MEASUREMENT)	SAMPLE NUMBER	FRACTURE ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	SOIL/ LITHOLOGIC LOG	SAMPLE DESCRIPTION
0.0 - 3.6 ft.	0.0 - 3.6 ft.	Recovery 3.1 ft.	0.0	RS		PT	0.0		Asphalt Black (10YR 2/1), gravel sand, organic binder, gravel to 1.5 cm, rounded fracture, dry Membrane at bottom
			0.4	DUP			0.4		
			0.8	RS		GM	0.8		Sand Gravel mix, pale yellow (2.5Y 7/4), gravel to 1.5 cm, subround to round, unconsolidated, moist,
			1.5	RS			1.0		Clay Sand Gravel, mottled - (top) very dark grayish brown (10YR 3/2), (middle) very pale brown (10YR 8/4), (bottom) reddish yellow (5YR 6/6), gravel to 4 cm, much gravel fractured, unconsolidated, slightly moist.
			2.0	RS		GC	2.0		Clay tends to occur in clots.
			2.5	RS			2.5		
			3.1	RS			3.1		No Recovery, 3.1-3.6 ft.
3.6							4.0		
							5.0		
							6.0		
							7.0		
							8.0		
							9.0		
							0.0		

NOTES: General: USCS is modified for this log as follows:

Materials amounts are estimated by % volume instead of % weight.

(1) Badly broken core, accurate footage measurements not possible.

(2) Core breaks cannot be matched, accurate footage measurements not possible.

RS = red screen  
 R = rads

128

## ROCKY FLATS PLANT BOREHOLE LOG

PAGE 1 OF 1Borehole Number: BH90898Surface Elevation: 5927 ftLocation - North: 749140 East: 2085835Area: 903 PAD/LIP mud 8/25/98Date: 4/22/98Total Depth: 4.0 ft.Geologist: R. KOEHLERCompany: TIERRAProject No.: GE600000Drilling Equip.: GEOPROBE/MACROCORESample Type: CONTINUOUS CORE

EG&amp;G LOGGING SUPERVISOR

APPROVAL Mark WardDATE 8/25/98

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL (FIELD MEASUREMENT)	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	SOIL LITHOLOGIC LOG	SAMPLE DESCRIPTION
Box 1 of 1 0.0-4.0 ft. Run #1 0.0-4.0 ft. Recovery 2.4 ft.							NA	0.0		0.0-0.4 Asphalt, black, fractured, membrane at 0.2 ft, gravel up to 1 cm - rounded
							GM	0.5		0.4-0.9 fill, sand and gravel, light olive-brown (2.5Y 5/6) gravel to 1.5 cm, rounded, med to coarse sand, unconsolidated, slightly micaceous, moist.
			001 0.9				GC	1.0		0.9-1.4, soil, clay sand gravel, very dark grayish brown (2.5Y 3/2), gravel to 3 cm, fractured, 19 pieces rock frags - granitic in part, fine to medium sand, firm, unconsolidated, moist, well graded.
			002 11:18					1.5		
			003 1.4					2.0		1.4-2.4 soil, clay sand, gravel, yellow (10YR 7/6), gravel to 1.5 cm, rounded, mixed lithology - some granitic, medium to coarse sand, unconsolidated, firm, moist.
			004 11:16					2.5		
			005 1.9					2.9		No Recovery 2.4-4.0 ft.
			006 11:15					3.0		Some of gravel "rotten" or weathered.
			007 2.4					3.5		
			008 11:14					4.0		T.D. = 4.0 ft.
			008 2.9					5.0		
								6.0		
								7.0		
								8.0		
								9.0		

NOTES: General: USCS is modified for this log as follows:

Materials amounts are estimated by % volume instead of % weight.

(1) Badly broken core, accurate footage measurements not possible.

(2) Core breaks cannot be matched, accurate footage measurements not possible.

## ROCKY FLATS PLANT BOREHOLE LOG

PAGE 1 OF 1

Borehole Number: BH90998  
 Location - North: 5 RPK 5/5/98 East: 2085910  
 Date: 5/4/98 SOUTH 749141  
 Geologist: R. KOEHLER  
 Drilling Equip.: GEO PROBE/MACROCORE

Surface Elevation: 5976 ft.  
 Area: 903 PAD / LIP 8/25/98  
 Total Depth: 4.0 ft.  
 Company: TIERRA Project No.: GE600000  
 Sample Type: CONTINUOUS CORE

EG&amp;G LOGGING SUPERVISOR

APPROVAL Mark W. WardDATE 8/25/98

TOP-BOTTOM OF CORE HUBBOX	TOP-BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL (FIELD MEASUREMENT)	SAMPLE NUMBER	FLUORE ANNE	BEDDING ANNE	CHALK SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	SOIL/ LITHOLOGIC LOG	SAMPLE DESCRIPTION
Box 1 of 1 0.0-4.0 ft.	Run # 1 0.0-4.0 ft.	Recovery 3.1 ft.	001 0.8 002 1.3 003 1.0-24 004 1.8 005 10:21 006 2.3 007 10:18 008 2.8					0.0-0.4 0.5 0.8 1.0 1.3 1.5 1.8 2.0 2.3 2.5 2.8 3.0	0.0-0.4; Asphalt, black, brittle, rounded gravel up to 1cm, membrane at about 0.2 ft. 0.4-0.8; Fill; Sand and gravel; brown to dark brown (10YR 4/3), gravel up to 1.5cm, granitic and metamorphic 0.8-3.1; Soil; Clay-Gravel with minor sandy, very dark grayish brown (10YR 3/2) gravel up to 3cm, fractured, granitic and quartzite (?) rock fragments, granitics rotten, coarse sand granitic in part, firm, unconsolidated, moist.	
			009 3.8 010 4.0	10:06 09:52				3.5 3.8 4.0	No Recovery 3.1-4.0 ft.	
			009 Red Seven - 125ml sl. 3.8-4.0 ft. - 10:06 010 VOA - 125ml sl. 3.8-4.0 ft. - 09:52					4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0 9.5	T. D. = 4.0 ft. Note: Up to 15 ppm Foxboro TVA and 16 ppm Mini Rae VOC's measured. Some VOC's present throughout core. Maximum between 1.3 and 1.8 ft.	

NOTES: General: USCS is modified for this log as follows:

Materials amounts are estimated by % volume instead of % weight.

(1) Badly broken core, accurate footage measurements not possible.

(2) Core breaks cannot be matched, accurate footage measurements not possible.

PAGE 1 OF 1

## ROCKY FLATS PLANT BOREHOLE LOG

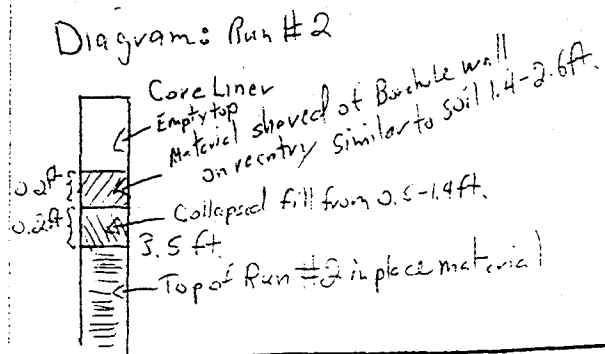
Borehole Number: BH91098  
 Location - North: 74906.2 East: 20856.10  
 Date: 3/25/98  
 Geologist: J. Berman R. KOEHLER  
 Drilling Equip.: Geoprobe

Surface Elevation: 5979 ft  
 Area: 903 PAD/HP/MD 8/25/98  
 Total Depth: 6.5 ft.  
 Company: Tierra Project No. GE600000  
 Sample Type: Continuous core MACROCORE

EG&amp;G LOGGING SUPERVISOR

APPROVAL Mark WoodDATE 8/25/98

TOPOGRAPHY OF CORE (ft)	TOPOGRAPHY OF BOX (ft)	INTERVAL OF CORE (ft)	FEET OF CORE IN INTERVAL (ft)	AREA (sq ft)	SAMPLE NUMBER	FIXTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH (ft)	SOIL / LITHOLOGIC LOG	SAMPLE DESCRIPTION
Box 1 of 1	0.0 - 6.5 ft.	Run #1 0.0 - 3.5 ft.	Recovery 2.8 ft.		1.001	11:52			Asphalt	0.0		0.0 - 0.5 Asphalt, black, fractured/brittle.
					1.002	1.9			GM	0.5		0.5 - 1.4 (FILL) Sand and Gravel, olive brown (2.5Y 4/3) Gravel fractured to rounded, up to 1.5 cm, fine to medium sand, poorly graded, unconsolidated, moist.
					1.003	11:50			GC	1.4		1.4 - 2.6 (Soil) Clay Sand Gravel, dark reddish brown (5YR 3/3), Gravel fractured to rounded up to 3 cm, Igneous Rock Fragments (IRF's), fine sand, matrix firm breaks into blocks, slightly plastic, moist, less gravel than BH91598, moist
					1.004	2.4				1.9		
					1.005	11:48			GM	2.4		No Recovery 2.8 - 3.5 ft. Clay Sand 2.6 - 2.8 ft. olive sand (2.5Y 6/8) in yellow brown (10YR 4/3) clay, fine sand, slightly consolidated, crumbly, poorly graded, moist.
					1.006	11:47				2.9		
					1.007	3.4			GC	3.4		3.5 - 3.9 ft. As Above 2.6 - 2.8 ft.
					1.008					3.9		3.9 - 5.9 ft. Clay/Sand/Gravel mottled light olive brown (2.5Y 5/6) dominant, gravel much greater than clay or sand, fractured, granitics up to 3 cm, fine sand, poorly graded, massive, moist.
										5.9		5.9 - 6.5 No Recovery
										6.0		
		Run #2 3.5 - 6.5 ft.	Recovery 2.8 ft. including 0.4 ft. plug.		1.009	40 ml RS	Rinse			6.5		TD = 6.5 ft.
					1.010	1 gallon R	Rinse			7.0		
										8.0		
										9.0		



NOTES. General: USCS is modified for this log as follows:

Materials amounts are estimated by % volume instead of % weight.

(1) Badly broken core, accurate footage measurements not possible.

(2) Core breaks cannot be matched, accurate footage measurements not possible.

## ROCKY FLATS PLANT BOREHOLE LOG

PAGE 1 OF 3Borehole Number: 8H91198Surface Elevation: 5979 ftLocation - North: 749064 East: 2085685Area: 903 PadDate: 021798 021898Total Depth: 21.4 ftGeologist: J. BayanCompany: TierraProject No.: CEG00000Drilling Equip.: Geoprobe - Dual WallSample Type: Continuous Core

EG&amp;G LOGGING SUPERVISOR

APPROVAL M. WoodDATE 2/23/98

## SAMPLE DESCRIPTION

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL (FIELD MEASUREMENTS)	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	SOIL/ LITHOLOGIC LOG	SAMPLE DESCRIPTION
0.0	0.0	0.0	001/001 RS 001/017 R				PT?	0.0		Asphalt - dry, chippy. Contains fibrous membrane.
			001/002 RS 001/018 R				SM	0.4		Fill - sand w/ fine gravel. Sl. moist. Dk brown (10YR 3/3) to dk. yellowish brn. (10YR 4/4).
			001/003 RS 001/019 R				SM/ GM	1.0		Sand-silt mixture w/ gravel to gravelly, sandy silt - parts of caliche common below ~ 1.8' sl. moist.
			001/004 RS 001/020 R					1.8		V. dk brown (10YR 2/2) above 1.8, then mottled below w/ dk brown (10YR 3/3), caliche (v. pale brn, 10YR 8/3), and other colors. To 3000 cpm on FINDER Q
			001/005 RS 001/021 R					2.0		1.0'
			001/006 RS 001/022 R					3.0		
			001/007 RS 001/023 R					3.4		
			001/008 RS 001/024 R					4.0		
			001/009 RS 001/025 R					5.0		
			001/010 RS 001/026 R					6.0		
			001/011 RS 001/027 R					7.0		
			001/012 RS 001/028 R					8.0		
			001/013 RS 001/029 R					9.0		
			001/014 RS 001/030 R					10.0		
			001/015 RS 001/031 R					11.0		
			001/016 RS 001/032 R					12.0		
			001/017 RS 001/033 R					13.0		
			001/018 RS 001/034 R					14.0		
			001/019 RS 001/035 R					15.0		
			001/020 RS 001/036 R					16.0		
			001/021 RS 001/037 R					17.0		
			001/022 RS 001/038 R					18.0		
			001/023 RS 001/039 R					19.0		
			001/024 RS 001/040 R					20.0		
			001/025 RS 001/041 R					21.0		
			001/026 RS 001/042 R					22.0		
			001/027 RS 001/043 R					23.0		
			001/028 RS 001/044 R					24.0		
			001/029 RS 001/045 R					25.0		
			001/030 RS 001/046 R					26.0		
			001/031 RS 001/047 R					27.0		
			001/032 RS 001/048 R					28.0		
			001/033 RS 001/049 R					29.0		
			001/034 RS 001/050 R					30.0		
			001/035 RS 001/051 R					31.0		
			001/036 RS 001/052 R					32.0		
			001/037 RS 001/053 R					33.0		
			001/038 RS 001/054 R					34.0		
			001/039 RS 001/055 R					35.0		
			001/040 RS 001/056 R					36.0		
			001/041 RS 001/057 R					37.0		
			001/042 RS 001/058 R					38.0		
			001/043 RS 001/059 R					39.0		
			001/044 RS 001/060 R					40.0		
			001/045 RS 001/061 R					41.0		
			001/046 RS 001/062 R					42.0		
			001/047 RS 001/063 R					43.0		
			001/048 RS 001/064 R					44.0		
			001/049 RS 001/065 R					45.0		
			001/050 RS 001/066 R					46.0		
			001/051 RS 001/067 R					47.0		
			001/052 RS 001/068 R					48.0		
			001/053 RS 001/069 R					49.0		
			001/054 RS 001/070 R					50.0		
			001/055 RS 001/071 R					51.0		
			001/056 RS 001/072 R					52.0		
			001/057 RS 001/073 R					53.0		
			001/058 RS 001/074 R					54.0		
			001/059 RS 001/075 R					55.0		
			001/060 RS 001/076 R					56.0		
			001/061 RS 001/077 R					57.0		
			001/062 RS 001/078 R					58.0		
			001/063 RS 001/079 R					59.0		
			001/064 RS 001/080 R					60.0		
			001/065 RS 001/081 R					61.0		
			001/066 RS 001/082 R					62.0		
			001/067 RS 001/083 R					63.0		
			001/068 RS 001/084 R					64.0		
			001/069 RS 001/085 R					65.0		
			001/070 RS 001/086 R					66.0		
			001/071 RS 001/087 R					67.0		
			001/072 RS 001/088 R					68.0		
			001/073 RS 001/089 R					69.0		
			001/074 RS 001/090 R					70.0		
			001/075 RS 001/091 R					71.0		
			001/076 RS 001/092 R					72.0		
			001/077 RS 001/093 R					73.0		
			001/078 RS 001/094 R					74.0		
			001/079 RS 001/095 R					75.0		
			001/080 RS 001/096 R					76.0		
			001/081 RS 001/097 R					77.0		
			001/082 RS 001/098 R					78.0		
			001/083 RS 001/099 R					79.0		
			001/084 RS 001/100 R					80.0		
			001/085 RS 001/101 R					81.0		
			001/086 RS 001/102 R					82.0		
			001/087 RS 001/103 R					83.0		
			001/088 RS 001/104 R					84.0		
			001/089 RS 001/105 R					85.0		
			001/090 RS 001/106 R					86.0		
			001/091 RS 001/107 R					87.0		
			001/092 RS 001/108 R					88.0		
			001/093 RS 001/109 R					89.0		
			001/094 RS 001/110 R					90.0		
			001/095 RS 001/111 R					91.0		
			001/096 RS 001/112 R					92.0		
			001/097 RS 001/113 R					93.0		
			001/098 RS 001/114 R					94.0		
			001/099 RS 001/115 R					95.0		
			001/100 RS 001/116 R					96.0		
			001/101 RS 001/117 R					97.0		
			001/102 RS 001/118 R					98.0		
			001/103 RS 001/119 R					99.0		
			001/104 RS 001/120 R					100.0		

NOTES: General: USCS is modified for this log as follows:

Materials amounts are estimated by % volume instead of % weight.

(1) Badly broken core, accurate footage measurements not possible.

(2) Core breaks cannot be matched, accurate footage measurements not possible.

In sample info: RS = rad screen  
R = rads  
V = VOCs



## ROCKY FLATS PLANT BOREHOLE LOG

PAGE 2 OF 3

Borehole Number: BH91198  
 Location - North: 749064 East: 2085685  
 Date: 021898  
 Geologist: J. Baylan  
 Drilling Equip.: Geoprobe

Surface Elevation: 5979 ft  
 Area: 903 Pad  
 Total Depth: 21.4 ft  
 Company: Tierra Project No.: GE600000  
 Sample Type: Continuous core

EG&amp;G LOGGING SUPERVISOR

APPROVAL M. WoodDATE 2/23/98

## SAMPLE DESCRIPTION

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL	MEASUREMENT	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	SOIL LITHOLOGIC LOG	SAMPLE DESCRIPTION
↑	10.0	10.0		N/A				GM	10.0		Same as above, 8.0-10.0'. Zone of fine grained material @ 11.1-12.0 composed of clayey rotten gravels. Most consumed by samples (JAS) (JAS)
	10.0	12.0	3.1'	001/024 R 001/008 RS 11.6 001/035 V 11.9 2.0 N/A				SC	11.0 11.1		(JAS) Sandy clay. Clayey sand w/ gravel - sl. moist. Several altered or clayey rotten gravels. Mottled colors, but mainly strong brown (7.5YR4/6) w/ streaks of light olive brown (2.5Y5/3). Some zones to sandy clay w/ gravel. Abrupt bottom. Contact, fairly sharp upper.
	12.0	14.0	3.0					GM	12.0		
	14.0	14.2						GM	13.5		Same as above, 8.0-10.0'.
	14.0	16.0	2.8	15.1 001/009 RS 001/075 R 15.5 001/036 - JOL 15.8 N/A 16.3				SC/GC	14.0 14.2		Same as above, 11.1-13.5, w/ increased gravel (to GC) @ 14.2-14.7. Then SC to 15.7, GC to 16.0.
	16.0	16.2						GM	16.0		Same as above, 11.1-13.5. Sl. moist.
	16.0	18.0	2.5	N/A				CL/X	17.0 17.2		Sandy clay to clay-sand mixture. Trace gravel. Sl. moist. Some colors as noted for 11.1-13.5.
	18.0	20.0	1.5'	18.6 001/040 RS 001/076 R 19.1 001/037 V 19.5 001/038 V 19.9 001/041 RS 001/047 R					18.0 19.0		Same as above but more SC. Sl. moist. Tr. gravel. SC portion @ base of recovery.
	18.0	20.0							19.5		Replace "No Recovery" pattern w/ clay stone pattern
	20.0	20.0							20.0		TOP OF BEDROCK = 19.5 NO RECOVERY See next page for description. 19.5 20.0

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Materials amounts are estimated by % volume instead of % weight.

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## ROCKY FLATS PLANT BOREHOLE LOG

PAGE 3 OF 3

Borehole Number: B491198  
 Location - North: 749064 East: 2085685  
 Date: 02/998  
 Geologist: J. Baylan  
 Drilling Equip.: Geoprobe

Surface Elevation: 5979 ft  
 Area: 903 Pad  
 Total Depth: 21.4 ft  
 Company: Tierra Project No.: GE600000  
 Sample Type: Continuous core

## EG&amp;G LOGGING SUPERVISOR

APPROVAL M. WoodDATE 2/23/98

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL (FIELD MEASUREMENT)	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	SOIL/ LITHOLOGIC LOG	SAMPLE DESCRIPTION
30 x 3 of 3 17.5-21.4' →	Run 9: 20.0- 21.4	3.1	See p. 2 20.2	of 3				20.0	---	Claystone to chertstone w/silt-grayish brown (2.5Y 5/2). Sl. moist. Traces carbonaceous flecks in some zones. Sand & gravel streamers @ ~0.7-1.1' below top of core remaining after sampling probably due to gravel @ contact falling into hole when core was lost in previous run. No hits. (Expect sands & gravels noted above to be out of place, not in original setting.) See logbook No recovery 21.3-21.4'
21.4	21.4	21.4	21.4					21.0	---	
								21.3	---	
								21.4	---	
								22.0	---	
								23.0	---	
								24.0	---	
								25.0	---	
								26.0	---	
								27.0	---	
								28.0	---	
								29.0	---	
								30.0	---	

TD = 21.4'

for more  
detailed explanation  
of lost core recovered  
core, imported sands &  
gravels.

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Materials amounts are estimated by % volume instead of % weight.

(1) Badly broken core, accurate footage measurements not possible.

(2) Core breaks cannot be matched, accurate footage measurements not possible.

PAGE 1 OF 1

Surface Elevation: 5978 ft  
Area: 903 Pad  
Total Depth: 3.5 ft  
Company: Tierra Project No.: GE60000  
Sample Type: Continuous core

APPROVAL M. Ward

DATE 2/23/98

13

RS = red screen

$$R = \mathbb{Z}[\frac{1}{2}]$$

- (1) Badly broken core, accurate footage measurements not possible.  
(2) Core breaks cannot be matched, accurate footage measurements not possible.

## ROCKY FLATS PLANT BOREHOLE LOG

PAGE 1 OF 1

Borehole Number: BH91398  
 Location - North: 749065 East: 2085834  
 Date: 4/27/98 (Core 4/22/98)  
 Geologist: R. KOEHLER  
 Drilling Equip.: GEOPROBE/Macrocore

Surface Elevation: 5977 ft  
 Area: 903 PAD/LTP,mm  
 Total Depth: 4.0 ft 8/25/98  
 Company: TIERRA Project No.: GE600000  
 Sample Type: CONTINUOUS CORE

EG&amp;G LOGGING SUPERVISOR

APPROVAL Mark WordDATE 8/25/98

TOP/BOTTOM OF CORE HBOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL FIELD MEASUREMENT	SAMPLE NUMBER	FLUCTUATE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	SOIL/ LITHOLOGIC LOG	SAMPLE DESCRIPTION
Box 1 of 1 0.0-4.0 ft.	Run #1 0.0-4.0 ft.	Recovery 2.4 ft.				NA		0.4		0.0-0.4; Asphalt, black, membrane about 0.3 ft, ductile breaks into slabs, rounded gravel up to 1 cm.
						GM		0.5		
			001	11:12				0.8		0.4-0.8; Fill: sand and gravel; dark yellowish brown (10YR 4/6) gravel up to 2 cm, rounded, mixed lithologies, coarse sand, poorly graded, unconsolidated, moist.
			002	1.3		GC		1.0		
			003	11:10				1.3		0.8-1.3 ft; Soil, clay, sand, gravel; dark grayish brown (10YR 4/2), minor gravel content up to 2 cm, fractured, granitic igneous rock frags, fine to medium sand, well graded.
			004	1.8				1.5		1.3-1.5 ft Transition fine, unconsolidated, moist.
			005	11:08				1.8		1.5-2.4 ft Soil, clay sand gravel, yellow (10YR 7/6), gravel up to 3 cm, rounded and fractured, granitic igneous rock fragments, quartzite, fine to medium sand, firm, sticky, moist.
			006	2.3				2.0		
			007	11:26				2.3		
			008	2.8				2.4		2.4-4.0 ft; No Recovery
								2.8		
								3.0		
								3.5		
								4.0		T.D. = 4.0 ft.

NOTES General: USCS is modified for this log as follows:

Materials amounts are estimated by % volume instead of % weight.

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## ROCKY FLATS PLANT BOREHOLE LOG

PAGE 1 OF 1

Borehole Number: BH91498  
 Location - North: 749066 East: 2085909  
 Date: 5/4/98  
 Geologist: R. KOEHLER  
 Drilling Equip.: GEOPROBE/MACROCORE

Surface Elevation: 5976 ft  
 Area: 903 PAD/LTP  
 Total Depth: 4.5 8/25/98  
 Company: TIERRA Project No.: CE600000  
 Sample Type: CONTINUOUS CORE

EG&amp;G LOGGING SUPERVISOR

APPROVAL

*Mark Wood*

DATE

8/25/98

FORMATION OF CASE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE INTERVAL (FIELD MEASUREMENT)	SAMPLE NUMBER	FLUORENCE AREA	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	SOIL LITHOLOGIC LOG	SAMPLE DESCRIPTION
Box 1 of 1 0.0-4.0 ft.	Run #1 0.0-4.0 ft.	Recovery 3.2 ft.					NA			0.0-0.4; Asphalt, black, gravel up to 1.5 cm, rounded, membrane about 0.2 ft, brittle/fractured.
			001	0.8			GM	0.5		0.4-0.8; Fill; Sand and gravel; brown to dark brown (10YR 4/3), rounded granitic (and quartzitic) sandstone rock, fragments up to 1.5 cm; medium to coarse sand.
			002	1.3			GC	1.0		0.8-1.8; Soil; (unconsolidated, crumbly, moist)
			003	11:25				1.5		clay/sand/gravel, very dark grayish brown at top, gets lighter colored towards bottom, gravel up to 3 cm, fractured, granitic fragments and quartzite, sand minor-fine grained, unconsolidated, firm, moist.
			004	1.8						
			005	11:23			SC	2.0		1.8-3.2; Soil; largely clay and sand with trace gravel, pink (7.5YR 7/4), fine sand (silty?), gravel up to 3 cm - fractured, sticky-firm, moist.
			006	2.3				2.5		
			007	11:21				3.0		
			008	2.8				3.2		
								3.5		No Recovery 3.2-4.0 ft.
								4.0		T.D. = 4.0 ft.
								5.0		
								6.0		
								7.0		
								8.0		
								9.0		

NOTES. General: USCS is modified for this log as follows:

Materials amounts are estimated by % volume instead of % weight.

(1) Badly broken core, accurate footage measurements not possible.

(2) Core breaks cannot be matched, accurate footage measurements not possible.

## ROCKY FLATS PLANT BOREHOLE LOG

PAGE 1 OF 1

Borehole Number: BH91598  
 Location - North: 748987 East: 2085610  
 Date: 3/25/98  
 Geologist: J. Z. R. KOEHLER  
 Drilling Equip.: Geoprobe

Surface Elevation: 5980 ft  
 Area: 903 PAD / LHP-MW-125197  
 Total Depth: 3.5 ft  
 Company: Tierra Project No. GE600000  
 Sample Type: Continuous core MACROCORE

EG&amp;G LOGGING SUPERVISOR

APPROVAL

Mark WardDATE 8/25/98

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL MEASUREMENT	SAMPLE NUMBER	FLUCTUATION ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	SOIL / LITHOLOGIC LOG	SAMPLE DESCRIPTION
Box lot 1 0.0-3.5 ft.	Run #1 0.0-3.5 ft.	Recovery 2.5 ft.					Asphalt	0.0		0.0-0.8 ft. Asphalt, black, consolidated at top fractured in lower half.
							Gm	0.5		
								2.8		
								1.0		0.8-1.5 ft. (Fill) Sand and Gravel, olive-brown (5.5Y4/3) subangular gravel, granitic and metamorphic, up to 1.5 cm, fine to coarse sand, well graded, unconsolidated, friable, moist.
			1.001 R 1.5	12:58			GC	1.5		1.5-2.5 ft. (Soil) Clay Sand Gravel, very dark brown (10YR 2/3) in top half, brown (7.5YR 4/3) in bottom half, gravel, fractured, up to 3 cm, granitic and quartzite, and fine sands, top half more clayey, bottom more sandy, clays plastic, crumbles to blocks, well graded, moist.
			1.002 R 2.5	12:58				2.0		
			1.003 R 2.5	12:55				2.5		
			1.004 R 2.5	12:53				3.0		2.5-3.5 No Recovery
			1.005 R 3.0	12:53				3.5		
			1.006 R 3.0	12:52				4.0		
								5.0		
								6.0		
								7.0		
								8.0		
								9.0		
								10.0		

TD = 3.5 ft.

NOTES. General: USCS is modified for this log as follows:

Materials amounts are estimated by % volume instead of % weight.

(1) Badly broken core, accurate footage measurements not possible

(2) Core breaks cannot be matched, accurate footage measurements not possible.

## ROCKY FLATS PLANT BOREHOLE LOG

PAGE 1 OF 1

Borehole Number: RH91698  
 Location - North: 749989 East: 2085684  
 Date: 5/6/98  
 Geologist: R. KOEHLER  
 Drilling Equip.: GEOPROBE/MACROCORE

Surface Elevation: 5979 ft  
 Area: 903 PAD/LIP ms 8/25/98  
 Total Depth: 4.0 ft  
 Company: TIERRA Project No.: GE600000  
 Sample Type: CONTINUOUS CORE

EG&amp;G LOGGING SUPERVISOR

APPROVAL Mark WoodDATE 8/25/98

TOP OF CORE IN BOX	TOP OF CORE IN INTERVAL	FEET OF CORE IN INTERVAL (FIELD MEASUREMENT)	SAMPLE NUMBER	FLUORESCENCE ANALYSIS	BEARING ANALYSIS	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	SOIL/ LITHOLOGIC LOG	SAMPLE DESCRIPTION
Box lot 1 0.0-4.0 ft.	Run #1 0.0-4.0 ft.	Recovery 3.4 ft.					NA	0.0		0.0-0.5: Asphalt, black/gray, fractured - unusually powdery, fractured gravel up to 1 cm, granitic and metamorphic rocks
			001	0.9			GM	0.5		0.5-0.9: Filly Sand and Gravel, light yellowish brown (10YR 6/4), rounded granitic and metamorphic rock frags, rounded, RPK 5/6/98
			002	11:43			GC	1.0		0.9-3.4: Unconsolidated, dry, coarse sand
			012	1.4				1.0		Soil: clay, sand, gravel; very dark grayish brown (10YR 3/2) at top grades to dark reddish brown (5YR 3/2) at bottom; gravel to 3 cm, fractured, rotten granitic rock fragments and quartzites, fine sand rare coarse sand, firm to hard, unconsolidated, slightly moist to dry.
			003	11:38				1.4		
			004	1.9				1.5		
			005	11:35				1.9		
			006	2.4				2.0		
			007	11:32				2.4		
			008	2.9				2.5		
								3.0		
								3.4		
								3.5		No Recovery 3.4-4.0 ft.
								4.0		
								4.5		T.D. = 4.0 ft.
								5.0		Note: Sample interval 0.9-1.4 had high $\alpha$ and $\gamma$ -ray readings
								5.5		$\gamma$ = 28,000 counts per minute with fiddler.
								6.0		
								6.5		
								7.0		
								7.5		
								8.0		
								8.5		
								9.0		
								9.5		

NOTES: General: USCS is modified for this log as follows:

Materials amounts are estimated by % volume instead of % weight.

(1) Badly broken core, accurate footage measurements not possible.

(2) Core breaks cannot be matched, accurate footage measurements not possible.

## ROCKY FLATS PLANT BOREHOLE LOG

PAGE 1 OF 1

Borehole Number: BH91799  
 Location - North: 748989 East: 2085759  
 Date: 020998  
 Geologist: J. Baylan  
 Drilling Equip.: Geoprobe

Surface Elevation: 5978 ft  
 Area: 903 pad  
 Total Depth: 3.0 ft  
 Company: Tierra Project No.: GE600000  
 Sample Type: Continuous core

EG&amp;G LOGGING SUPERVISOR

APPROVAL M. WardDATE 2/23/98

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL (FIELD MEASUREMENT)	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	SOIL/ LITHOLOGIC LOG	SAMPLE DESCRIPTION
0.0	0.0	0.0	N/A					0.0		NO RECOVERY 0.0-0.3
	0.3	0.3	0.5				PT?	0.3		Asphalt - crumbly, dry chips.
			BOTTLE 001-RS				SM	0.4		Sand w/ silt & gravel - dry to sl. moist. V. med sand
			002-R					0.5		fine gravel mainly. Brown (10/25/3). looks like artificial
			1.1					1.0		silt.
			BOTTLE 003-RS				GC	1.1		Gravel w/ sand & clay to clayey silt. Dry to sl. moist.
			004-R					1.2		To 14,000+ $\gamma$ @ 1.9-2.5'. Also silty zones. Matrix
			1.6					2.0		to v. dark brown (10+R 2/2). Abundant calcic
			BOTTLE 005-R					2.1		(as discrete pods) below 2.0', where gravel is
			006-R					2.2		decreased relative to fines. Almost entirely <sup>interval</sup> consumed
			2.0					2.3		by samples. Some portions
			BOTTLE 007-RS					2.4		especially below 2.0' to G.M.
			008-R					2.5		
			2.4					2.6		
			N/A					2.7		
								2.8		
								2.9		
								3.0		
								3.1		
								3.2		
								3.3		
								3.4		
								3.5		
								3.6		
								3.7		
								3.8		
								3.9		
								4.0		
								4.1		
								4.2		
								4.3		
								4.4		
								4.5		
								4.6		
								4.7		
								4.8		
								4.9		
								5.0		
								5.1		
								5.2		
								5.3		
								5.4		
								5.5		
								5.6		
								5.7		
								5.8		
								5.9		
								6.0		
								6.1		
								6.2		
								6.3		
								6.4		
								6.5		
								6.6		
								6.7		
								6.8		
								6.9		
								7.0		
								7.1		
								7.2		
								7.3		
								7.4		
								7.5		
								7.6		
								7.7		
								7.8		
								7.9		
								8.0		
								8.1		
								8.2		
								8.3		
								8.4		
								8.5		
								8.6		
								8.7		
								8.8		
								8.9		
								9.0		
								9.1		
								9.2		
								9.3		
								9.4		
								9.5		
								9.6		
								9.7		
								9.8		
								9.9		
								10.0		

NOTES: General: USCS is modified for this log as follows:

Materials amounts are estimated by % volume instead of % weight.

(1) Badly broken core, accurate footage measurements not possible.

(2) Core breaks cannot be matched, accurate footage measurements not possible.

Sample types: RS = rad screen  
R = rad's





## ROCKY FLATS PLANT BOREHOLE LOG

PAGE 1 OF 1

Borehole Number: B#91998  
 Location - North: 748990 East: 2085909  
 Date: 4/29/98  
 Geologist: R. KOEHLER  
 Drilling Equip.: GEOPROBE/MACROCORE

Surface Elevation: 5976 ft.  
 Area: 903 PAD/LTP  
 Total Depth: 4.0 ft. 8/25/98  
 Company: TIERRA Project No.: GE600000  
 Sample Type: CONTINUOUS CORE

EG&amp;G LOGGING SUPERVISOR

APPROVAL

Mark Ward

DATE

8/25/98

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL (FIELD MEASUREMENT)	SAMPLE NUMBER	FRAC. TIME ARISE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	SOIL/ LITHOLOGIC LOG	SAMPLE DESCRIPTION
Box 1 of 1 0.0-4.0 ft.	Run # 1 0.0-4.0 ft.	Recovery 2.7 ft.	001	13:06			NA			0.0-0.5 Asphalt, black, brittle, gravel to 1 cm - rounded and fractured, membrane at 0.3 ft. RPK 4/29/98
			002	0.5				0.5		
			003	13:08			GM			0.5-0.9 Fill, sand and gravel, brown to dark brown (10YR 4/3), minor rounded lens gravel, med. to coarse sand.
			004	0.9				1.0		
			005	13:16			GC			0.9-2.5 Soil, clay sand (unconsolidated, moist)
			006	1.4				1.5		
			007	13:13				2.0		
			008	1.9				2.5		
			009	13:03				3.0		
			010	2.4				3.5		
			011	13:01			SC			2.5-2.9 Clay Sand - TRACE Gravel, yellow (10YR 8/6) fractured gravel to 1 cm, fine sand, firm, sticky, moist.
			012	2.9				4.0		No Recovery 2.7-4.0 ft.
										FD = 4.0 ft.

NOTES. General: USCS is modified for this log as follows:

Materials amounts are estimated by % volume instead of % weight.

(1) Badly broken core, accurate footage measurements not possible.

(2) Core breaks cannot be matched, accurate footage measurements not possible.

## ROCKY FLATS PLANT BOREHOLE LOG

PAGE 1 OF 1

Borehole Number: BH92098Surface Elevation: 5980 ftLocation - North: 748913 East: 2085609Area: 903 PAD/LIP and 8/25/98Date: 5/7/98Total Depth: 4.0 ftGeologist: R. KOEHLERCompany: TIERRAProject No.: GE60000Drilling Equip.: GEO PROBE/MACROCORESample Type: CONTINUOUS CORE

EG&amp;G LOGGING SUPERVISOR

APPROVAL

Mark Wood

DATE

8/25/98

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF RETRIAL	FEET OF CORE IN INTERVAL (FIELD MEASUREMENT)	SAMPLE NUMBER	INITIAL TIME A/C/E	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	SOIL/ LITHOLOGIC LOG	SAMPLE DESCRIPTION
Box 1 of 1 0.0-4.0 ft.	Run #1 0.0-4.0 ft.	Recovery 3.1 ft.					NA			0.0-0.5: Asphalt, black, brittle, top in coin shaped pieces, gravel less than 1.0 cm, rounded, no obvious membrane.
			001	0.9			GM	0.5		
			002	13:37				0.9		0.5-0.9: Fill, Sand and Gravel; dark yellowish brown (10YR 4/4) rounded gravel up to 1 cm, coarse sand, unconsolidated, moist
			003	1.4			GC	1.0		
			004	13:34				1.4		0.9-3.1: Soil, clay, sand, gravel, top is dark reddish brown (5YR 3/1) grading down to white (10YR 8/6) at bottom, gravel up to 3 cm, larger pieces fractured, smaller pieces rounded, metamorphic and rotten granitic clasts, medium grained sand, granitic in part, crumbly, slightly moist, caliche heavy in lower 1.5 ft.
			005	1.9				1.9		
			006	13:32				2.0		
			007	2.4				2.5		
			008	13:30				2.9		
				2.9				3.0		
								3.1		
								3.5		No Recovery 3.1-4.0 ft.
								4.0		
								4.5		T.D. = 4.0 ft.
								5.0		
								5.5		
								6.0		
								6.5		
								7.0		
								7.5		
								8.0		
								8.5		
								9.0		
								9.5		

NOTES: General: USCS is modified for this log as follows:

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## ROCKY FLATS PLANT BOREHOLE LOG

PAGE 1 OF 1

Borehole Number: BH92198  
 Location - North: 748914 East: 2085684  
 Date: 5/7/98  
 Geologist: R. KOEHLER  
 Drilling Equip.: GEOPROBE/MACROCORE

Surface Elevation: 5979 ft  
 Area: 903 PAD/LTP MW 8/25/98  
 Total Depth: 4.0 ft.  
 Company: TIERRA Project No.: GE600000  
 Sample Type: CONTINUOUS CORE

EG&amp;G LOGGING SUPERVISOR

APPROVAL

Mark WoodDATE 8/25/98

## SAMPLE DESCRIPTION

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL (FIELD MEASUREMENT)	SAMPLE NUMBER	TIME IN HOURS	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	SOIL/ LITHOLOGIC LOG	SAMPLE DESCRIPTION
Box 1 of 1 0.0-4.0 ft.	Run #1 0.0-4.0 ft.	Recovery 3.4 ft.					NA			0.0-0.4: Asphalt, black, brittle, fractured, rounded gravel up to 1 cm, membrane at 0.2 ft.
			001	11:14			GM	0.5		0.4-0.7 ft. Fill: Sand and Gravel; dark grayish brown (10YR 4/2), rounded gravel up to 1 cm, gravel granitic in part, coarse Sand, unconsolidated, moist
			002	1.2			GC	0.7		
			003	11:12				1.0		0.7-3.4 ft Soil: clay, Sand and gravel; dark reddish brown (5YR 3/2-3/3) gravel up to 3 cm, fractured, rotten granitic and micaceous metamorphic rock fragments, medium sized sand - micaceous, unconsolidated, firm, well graded, slightly moist.
			004	1.7				1.2		
			005	11:08				1.5		No Recovery 3.4-4.0 ft.
			006	2.2				1.7		
			007	11:06				2.0		
			008	2.7				2.2		
								2.5		
								2.7		
								3.0		
								3.5		
								4.0		
								4.5		
								5.0		
								5.5		
								6.0		
								6.5		
								7.0		
								7.5		
								8.0		
								8.5		
								9.0		
								9.5		

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## ROCKY FLATS PLANT BOREHOLE LOG

PAGE 1 OF 1

Borehole Number: BH 92298  
 Location - North: 778914 East: 2085760  
 Date: 020498  
 Geologist: J. Baylan  
 Drilling Equip.: Geoprobe

Surface Elevation: 5977 ft  
 Area: 903 pad  
 Total Depth: 3.0 ft  
 Company: Tierra Project No.: GE60000  
 Sample Type: Continuous core

EG&amp;G LOGGING SUPERVISOR

APPROVAL M. WardDATE 2/23/98

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL (FIELD MEASUREMENT)	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	SOIL/ LITHOLOGIC LOG	SAMPLE DESCRIPTION
0.0	0.0	0.0	ALLAGE RIN EVENT 001				Asphalt	0.0		NO RECOVERY 0.0-0.3 (solid point bit)
0.3	0.3	0.3	BOTTLE 7 = mds				PT	0.3		Asphalt - crumbly black.
			BOTTLE 8 = mds				SM	0.5		Fill - sand w/silt + fine gravel. Light yellowish brown (2.5-4 w/s). Dry.
			BOTTLE 5 = mds					0.9		Sandy silty gravel. Consumed by samples.
			BOTTLE 6 = r.s.					1.0		Dry. Some to abundant rock flour, abundant shattered gravels.
			BOTTLE 3 = mds				GM	2.0		Clayey gravel to gravelly clay. Yellowish red,
			BOTTLE 4 = r.s.				GC	2.3		5-4 R 4/6. w/silt, sand traces. Moderately
			BOTTLE 1 = mds					2.3		stiff. Sl. moist.
			2 = r.s.							NO RECOVERY 2.3-3.0
3.0	3.0	3.0	N/A					3.0		TD = 30'
								4.0		
								5.0		
								6.0		
								7.0		
								8.0		
								9.0		
								10.0		

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145

## ROCKY FLATS PLANT BOREHOLE LOG

PAGE 1 OF 1Borehole Number: BH92398Surface Elevation: 5976 Ft.Location - North: 748915 East: 2085834Area: 903 PAD/LTP and 8/25/98Date: 4/28/98Total Depth: 4.0 ft.Geologist: R. KOEHLERCompany: TIERRAProject No.: GE600000Drilling Equip.: GEOPROBE/MACKRO CORESample Type: CONTINUOUS CORE

EG&amp;G LOGGING SUPERVISOR

APPROVAL

Mark WoodDATE 8/25/98

TOP OF CORE IN BOX	TOP OF CORE OF INTERVAL	FEET OF CORE IN INTERVAL (FIELD MEASUREMENT)	SAMPLE NUMBER	FRASURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	SOIL/ LITHOLOGIC LOG	SAMPLE DESCRIPTION
Box 1 of 1 0.0-4.0 ft.	Run #1 0.0-4.0 ft.	Recovery 2.9 ft.					NA	0.5		0.0-0.7 Asphalt, black, brittle-fractured, gravel to 1 cm, rounded, membrane at about 0.2 ft, dry.
							GM	0.7		
								1.0		0.7-1.3 Fill, sand and gravel, light yellowish brown (10YR 6/4), minor gravel to 1 cm - rounded, med-coarse sand, unconsolidated, dry.
			001	13			GC	1.3		
			002	13:04				1.5		1.3-2.9 Soil, clay, sand, gravel, brown to dark brown (10YR 4/3), fractured gravel to 3 cm, granitic rock frag, quartzite too, minor sand - fine to medium, firm, unconsolidated, slightly moist.
			003	1.8				1.8		
			004	13:02				2.0		
			005	2.3				2.3		
			006	13:00				2.5		
			007	2.8				2.8		
			008	12:58				3.0		
				3.3				3.3		
								3.5		No Recovery 2.9-4.0 ft.
								4.0		T.D. = 4.0 ft.
								5.0		
								6.0		
								7.0		
								8.0		
								9.0		

NOTES. General: USCS is modified for this log as follows:

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## ROCKY FLATS PLANT BOREHOLE LOG

PAGE 1 OF 1

Borehole Number: BH92498  
 Location - North: 748915 East: 2085909  
 Date: 4/29/98  
 Geologist: R. KOEHLER  
 Drilling Equip.: GEOPROBE/MACROCORE

Surface Elevation: 5976 ft.  
 Area: 903 PAD/LIP 8/25/98  
 Total Depth: 4.0  
 Company: TIERRA Project No.: GE600000  
 Sample Type: CONTINUOUS CORE

EG&amp;G LOGGING SUPERVISOR

APPROVAL

Mark Ward

DATE

8/25/98

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL (FIELD MEASUREMENT)	SAMPLE NUMBER	FINAL CORE ANALYSIS	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	SOIL/ LITHOLOGIC LOG	SAMPLE DESCRIPTION
Box 1 of 1 0.0-4.0 ft.	Run # 1 0.0-4.0 ft.	Recovery 2.9 ft.					NA	0.0		0.0-0.5 Asphalt, black, brittle, 1cm rounded gravel,
							GM	0.5		
			001	1.1				1.0		0.5-1.1 Fill, sand and gravel, yellowish brown (10YR 5/4), minor rounded gravel up to 1.5cm, medium to coarse sand, unconsolidated, slightly moist.
			002	1.6				1.5		
			003	2.1				2.0		1.1-2.1 Soil, gravel dominant with minor clay and sand, very dark grayish brown (10YR 3/2), fractured granitic rock fragments up to 3cm, crumbly, slightly moist.
			004	2.6				2.5		
			005	2.6				2.9		2.1-2.9 Soil, clay sand gravel, 2.1-2.6 very dark grayish brown (10YR 3/2) grades to yellow (2.6-2.9) (10YR 7/6), much less gravel than 1.1-2.1, fractured granitic fragments to 3cm, fine sand, caliche?, firm, slightly moist.
			006	3.1				3.1		
			007					3.5		No Recovery 2.9-4.0 ft.
			008					4.0		
			011	And Screen Rinse 40ml						T.D = 4.0 ft.
			012	Road Isotope Rinse 1 gallon						
			both	10:33				5.0		
								6.0		
								7.0		
								8.0		
								9.0		

NOTES: General: USCS is modified for this log as follows:

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## ROCKY FLATS PLANT BOREHOLE LOG

PAGE 1 OF 2

Borehole Number: B492598Surface Elevation: 5978 ftLocation - North: 249415 East: 20959092085560Area: 903 PAD/LIP AreaDate: 2/23/98 2/24/98 3/2/98 7/14/97Total Depth: 18.5 ftGeologist: R. KOEHLERCompany: TierraProject No.: GE600000Drilling Equip.: Geoprobe - Dual WallSample Type: Continuous core Dual Wall

EG&amp;G LOGGING SUPERVISOR

APPROVAL

Mark Wood

DATE

8/25/98

TOP/BOTTOM OF CORE INTERVAL	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL (FIELD MEASUREMENTS)	SAMPLE NUMBER	FIACITURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	SOIL LITHOLOGIC LOG	SAMPLE DESCRIPTION
Box 1 of 2 0.0-10.0 ft	Run #1 0.0-4.0 ft (46.5 inches)	Recovery 2.6 ft.	RS/R	1.001/1.017			GM	0.0	0.0-0.2 ft. Sand and Gravel, light yellowish brown (B.S.V. 6/4)	
			RS	1.008/1.018			GC	0.2	0.2-0.6 ft. Rock flour with medium sand, quartz and granitic sand and gravel, pale yellowish brown, angular, unconsolidated, gravel up to 1.5 cm, rounded.	
			RS	1.003/1.019				0.6	0.6-2.6 ft. (10YR 6/2) med. clay, sand, gravel; fine sand A.A., gran. fragments, unconsolidated, dark yellowish brown (10YR 7/4) Unconsolidated, dry, fibrous membrane with adhering caliche at base.	
			RS	1.004/1.030				1.0		
			RS					1.5		
Box 1 of 2 0.0-10.0 ft	Run #2 4.0-7.0 ft.	Recovery 3.0 ft.						2.0		
								2.6		
								3.0		
								4.0		
								5.0		
Box 1 of 2 0.0-10.0 ft	Run #3 7.0-10.0 ft.	Recovery 2.6 ft.						6.0		
								7.0		
								7.5		
								8.0		
								9.0		

NOTES: General: USCS is modified for this log as follows:

Materials amounts are estimated by % volume instead of % weight.

(1) Badly broken core, accurate footage measurements not possible.

(2) Core breaks cannot be matched, accurate footage measurements not possible.



## ROCKY FLATS PLANT BOREHOLE LOG

PAGE 2 OF 2

Borehole Number: BH92598  
 Location - North: 749064 East: 2085560  
 Date: 03/02/98  
 Geologist: J. Bayler R. KOEHLER  
 Drilling Equip.: Geoprobe - Dual Wall

Surface Elevation: 5978 ft  
 Area: 903 PAD/LIP Area  
 Total Depth: 18.5 ft.  
 Company: Tierra Project No.: GE600000  
 Sample Type: Continuous core Dual Wall

EG&amp;G LOGGING SUPERVISOR

APPROVAL

Mark WoodDATE 8/25/98

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL (FIELD MEASUREMENT)	SAMPLE NUMBER	FRACATURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	SOIL/ LITHOLOGIC LOG	SAMPLE DESCRIPTION
Box 2 of 2 10.0-8.5 ft.	Run #4 10.0-13.0 ft	Recovery 3.6 ft	13.0 RS R VGA 13.5	1.007 1.023 1.035			SC	10.0 11.0 12.0		10.0-13.0 Clayey Sand, yellowish red (5YR 5/6), medium to coarse grained, granitic and quartz grains, well graded, firm, plastic? (forms sausage-like extrusion on coring), moist.
	Run #5 13.0-16.0 ft	Recovery 2.5 ft	16.0 RS R VGA DOP 16.75	1.002 1.023 1.036 1.037			GC	13.0 14.0 15.0 15.5		13.0-15.5 ft, similar to above but gravel appears to be more quartzitic than granitic (quartzitic) throughout. Gravel fragments up to 2 cm. with RPK
	Run #6 16.0-18.5 ft	Recovery 4.0 ft					Sand stone	16.0 16.75 17.0 18.0		16.00 = Bedrock Contact. 16.0-18.5 ft, Fine to medium grained "sandstone" probably clayey, yellowish brown (10YR 5/6) is dominant, some light gray (10YR 7/1) at top, well sorted, unconsolidated to lightly indurated (crumbles easily), dry to slightly moist, massive
								19.0 20.0		Total Depth = 18.5 ft.

NOTES: General: USCS is modified for this log as follows:

Materials amounts are estimated by % volume instead of % weight.

(1) Badly broken core, accurate footage measurements not possible.

(2) Core breaks cannot be matched, accurate footage measurements not possible.

## ROCKY FLATS PLANT BOREHOLE LOG

PAGE 1 OF 1

Borehole Number: BH92698  
 Location - North: 748977 East: 2085551  
 Date: 5/19/98  
 Geologist: R. KOEHLER  
 Drilling Equip.: GEOPROBE/MACROCORE

Surface Elevation: 5979 ft  
 Area: 903 PAD/LIP Area  
 Total Depth: 3.0ft  
 Company: TIERRA Project No.: GE600000  
 Sample Type: CONTINUOUS CORE

EG&amp;G LOGGING SUPERVISOR

APPROVAL Mark WordDATE 8/25/98

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE INTERVAL IN FIELD MEASUREMENT	SAMPLE NUMBER	FLUORE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH: FEET	SOIL/ LITHOLOGIC LOG	SAMPLE DESCRIPTION
Box 106/ 0.0-3.0ft	Run #1 0.0-3.0ft	Recovery 2.5ft.	001	12:05			GM	0.0	0.0-0.4 ft: Fill: Sand & Gravel; brown (7.5YR 5/3) rounded gravel to 2.5cm, medium grained sand, well graded,	
			002	0.4				0.5		
			003	12:03			GC	0.9	0.4-2.5 ft: Soil	gravel includes granitic and meta- morphologic rock frags, unconsolidated dry, trace root hairs.
			004	0.9				1.0	clay, sand, gravel,	
			005	12:00				1.4	dark reddish brown	
			006	1.4				1.5	(5YR 3/3) with	
			007	11:58				1.9	speckled reddish yellow (5YR 7/6) between 1.5 and 2.2	ft., gravel up to 3cm, fractured, mostly quartzite, minor medium to coarse(?) sand, poorly graded, firm, unconsolidated, slightly moist.
			008	1.9				2.0		
								2.5		
								3.0		No Recovery 2.5-3.0ft.
			011	12:15	Rns	40ml Aslr	Water	3.5		T.D. = 3.0ft.
			012	12:15	Rns	1 gall Poly	Water	4.0		
								4.5		
								5.0		
								5.5		
								6.0		
								6.5		
								7.0		
								7.5		
								8.0		
								8.5		
								9.0		
								9.5		

NOTES: General: USCS is modified for this log as follows:

Materials amounts are estimated by % volume instead of % weight.

(1) Badly broken core, accurate footage measurements not possible.

(2) Core breaks cannot be matched, accurate footage measurements not possible

152

## ROCKY FLATS PLANT BOREHOLE LOG

PAGE 1 OF 1

Borehole Number: BH92798  
 Location - North: 748827 East: 2085553  
 Date: 5/18/98  
 Geologist: R. KOEHLER  
 Drilling Equip.: GEOPROBE/MACROCORE

Surface Elevation: 5980 ft.  
 Area: 903 PAD/LIP Area  
 Total Depth: 3.0 ft.  
 Company: TIERRA Project No.: GE60000  
 Sample Type: CONTINUOUS CORE


EG&amp;G LOGGING SUPERVISOR

APPROVAL

Mark Ward

DATE

8/25/98

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL (FIELD MEASUREMENTS)	SAMPLE NUMBER	FLUCTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	SOIL LITHOLOGIC LOG	SAMPLE DESCRIPTION
Box 1 of 1 0.0-3.0 ft.	Run #1 0.0-3.0 ft.	Recovery 2.6 ft.	001 002 003 004 005 006 007 008	0.4 0.9 1.4 1.9			GM GC	0.4 0.5 1.09 1.4 1.5 2.6 2.8 2.9		0.0-0.4 ft; Fill, sand and gravel, brown (10YR 5/3) granitic gravel broken rounded fragments, medium to coarse sand, (unconsolidated - friable, dry, root hairs). 0.4-2.6 ft; Soil; dark reddish brown (5YR 3/2) grades to reddish gray (5YR 5/2) at 1.5 ft., 1.5-2.6 ft. yellowish red (5YR 5/6); gravel, sand, clay; fractured gravel up to 2.5 cm, looks like mostly quartzite; medium to coarse sand not abundant; caliche - 0.2 ft intervals at 1.2 and 2.3 ft; firm, unconsolidated, well graded, slightly moist to dry. 2.6-3.0 ft No Recovery
								3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0 9.5		

NOTES: General: USCS is modified for this log as follows.

Materials amounts are estimated by % volume instead of % weight.

(1) Badly broken core, accurate footage measurements not possible.

(2) Core breaks cannot be matched, accurate footage measurements not possible.





## ROCKY FLATS PLANT BOREHOLE LOG

PAGE 1 OF 1Borehole Number: BH92998Surface Elevation: 5976 ftLocation - North: 748830 East: 2085853Area: 903 PAD/LIP AreaDate: 3/23/98Total Depth: 2.5 ft.Geologist: J. Brian R. KOEHLERCompany: Terra Project No. GE600000Drilling Equip.: GeoprobeSample Type: Continuous Core MACROCORE

EG&amp;G LOGGING SUPERVISOR

APPROVAL Mark WoodDATE 8/25/98

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL (FIELD MEASUREMENTS)	SAMPLE NUMBER	FINAL TIME ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	SOIL/ LITHOLOGIC LOG	SAMPLE DESCRIPTION
Box 1 of 1 0.0-2.5	Run #1 0.0-2.5 ft	Recovery 2.2 ft	1.001 1.002 1.003 1.004 1.005 1.006 1.007 1.008	11:06 0.5 11:04 1.0 11:03 1.5 11:02 2.0			GC	0.0 0.5 1.0 1.5 2.0 2.5		0.0-2.2 ft; Clay/Sand/Gravel, dark reddish brown (2.5YR 2.5/4) with mottling of yellow (10YR 8/8) at base. Gravel fractured top 3 cm, <del>medium</del> <sup>fine (PP)</sup> angular sand, granitic and quartzite grains, well graded, massive, clayey parts plastic form clumps, moist.
										No Recovery 2.2-2.5 ft.
										TD = 2.5 ft.

NOTES: General: USCS is modified for this log as follows:

Materials amounts are estimated by % volume instead of % weight.

(1) Badly broken core, accurate footage measurements not possible.

(2) Core breaks cannot be matched, accurate footage measurements not possible.



## ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE BOREHOLE LOG

PAGE 1 OF 1

Borehole Number: BH93199Surface Elevation: 5956 FtLocation - North: 748839 East: 2086167Area: 903 PAD Lip AreaDate: 1-13-99Total Depth: 3.7Geologist: T. LUTHERERCompany: TIERRAProject No. GE600000Drilling Equip.: GEO PROBE ALLIANCE 312/99Sample Type: CONTINUOUS

RMRS LOGGING SUPERVISOR

APPROVAL Mark WoodDATE 7-2-99

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL MEASUREMENT	SAMPLE NUMBER	FRAC. LINE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	SOIL LITHOLOGICAL LOG	SAMPLE DESCRIPTION
Box 1 of 1 0.0 - 3.7'	Bore #1 0.0 - 4.0'	Recovery: 3.7'	001	RS	001			1.5		0.0-3.7 Silty Sand 3YR 3/2 to 3YR 3/2 very dark gray to dark brown, very fine, trace medium to coarse, subangular sand, silty, trace broken lithic gravel up to 4mm, trace clay, trace organics, dry
				ISO	002					
				RS	001			1.0		
			002	ISO	002					
				RS	002			2.0		
			003	ISO	002			3.0		3.7-4.0 No Recovery
				RS	001					
			004	ISO	002			4.0		
				RS	001			5.0		
				RT	001					
			99A 43 58	001	(002)					
				002	(002)					
				003	(002)			6.0		
				004	(002)					
								7.0		
								8.0		
								9.0		

NOTES: General: USCS is modified for this log as follows:

Materials amounts are estimated by % volume instead of % weight.

(1) Badly broken core, accurate footage measurements not possible.

(2) Core breaks cannot be matched, accurate footage measurements not possible.

Procedure No. RMRS/OPS-PRO.101

Revision 0

Date effective: 12/31/98

Page 27 of 28

## ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE BOREHOLE LOG

PAGE 1 OF 1Borehole Number: BH 932 98Surface Elevation: 5964 FTLocation - North: 748671 East: 2085755Area: 903 PAD Lip AreaDate: 1-12-99Total Depth: 2.4Geologist: T. LUTHERERCompany: TIERRAProject No. GE600000Drilling Equip.: GEOPROBE DUAL WALLSample Type: CONTINUOUS

RMRS LOGGING SUPERVISOR

APPROVAL Mark WoodDATE 7/2/99

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL MEASUREMENT	SAMPLE NUMBER	ANALYSIS	BLDG/AS ANALYSIS	CHAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	SOIL/ LITHOLOGIC TEXT	SAMPLE DESCRIPTION
Box 1 of 1 0.0 - 2.4	Run # 1 0.0-4.0	Recovery: 2.4	001	RS	001	CL	CL	0.5		0.0-0.6 Silty Clay 3YR N3 Very dark gray, with trace sand and up to 3cm lithic speck, with roots, moist, mod. plasticity 0.6-2.4 Gravely Clayey Sand 6YR 6/4 → 4YR 4/3 Light brown to dark brown, very fine to coarse, subangular to angular, green, gassy as a bore silty, moderately plastic moist 2.0-4.0 No Recovery 7/1-12-98
			002	RS	001			1.0		
			003	ISO	002		SC	1.5		
			004	ISO	002			2.0		
								2.4		
								3.0		
								4.0		
			99A 43 56	RS	001	RI		5.0		
			"		002	001				
			"		003	001				
			"		004	001		6.0		
								7.0		
								8.0		
								9.0		

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(1) Badly broken core, accurate footage measurements not possible.

(2) Core breaks cannot be matched, accurate footage measurements not possible.

Procedure No. RMRS/OPS-PRO.101

Revision 0

Date effective: 12/31/98

Page 27 of 28



## ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE BOREHOLE LOG

PAGE 1 OF 1

Borehole Number: BH 93398  
 Location - North: 748698 East: 2085857  
 Date: 1-12-99  
 Geologist: T. LUTHERER  
 Drilling Equip.: GEO PROBE DUAL WALL

Surface Elevation: 5956 Ft  
 Area: 903 PAD Lip Area  
 Total Depth: 3.8  
 Company: TERRA Project No. GE600000  
 Sample Type: CONTINUOUS

RMRS LOGGING SUPERVISOR

APPROVAL Mark WoodDATE 7-2-99

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL MEASUREMENT	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	SOIL/ LITHOLOGIC TEXT	SAMPLE DESCRIPTION
Box 1 of 1 0.0 - 3.8	Run # 1 0.0 - 4.0	Recovery: 3.8	001	RS	001			1.5		2.0-2.9 Silty Clay 2YR 2/2 very dark brown, with organics, very fine to fine sand, trace up to 2.5 cm angular lithic gravel. mon to trace plasticity, moist.
			002	ISO	002		CL	1.0		
			003	RS	001			1.5		
			004	ISO	002			2.0		
								2.7		2.0-2.7 Silty Clay 5YR 4/6 dark yellowish brown, A/A, moderate to high plasticity moist
							CL	3.0		2.7-3.8 Sandy Clay 5YR 5/2 to 6YR 6/6 reddish gray to reddish yellow very fine to fine angular sand, some med. mod plasticity, gravel A/A, moist
							SC	4.0		3.8-4.0 NO RECOVERY
								5.0		
								6.0		
								7.0		
								8.0		
								9.0		

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(1) Badly broken core, accurate footage measurements not possible.

(2) Core breaks cannot be matched, accurate footage measurements not possible.

Procedure No. RMRS/OPS-PRO.101

Revision 0

Date effective: 12/31/98

Page 27 of 28

## ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE BOREHOLE LOG

PAGE 1 OF 1

Borehole Number: BH93498  
 Location - North: 748702 East: 2086198  
 Date: 1-19-99  
 Geologist: T. LUTHERER  
 Drilling Equip.: GEO PROBE DUAL WALL

Surface Elevation: 5942  
 Area: 903 PAD Lip Area  
 Total Depth: 3.2  
 Company: TIERRA Project No. GE600000  
 Sample Type: CONTINUOUS

RMRS LOGGING SUPERVISOR

APPROVAL Mark WardDATE 7-2-99

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE INTERVAL MEASUREMENT	SAMPLE NUMBER	FLAC/THL ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	SOIL/ LITHOLOGIC LOG	SAMPLE DESCRIPTION
Box 10F1	0.0-3.2	Recovery: 3.2	001	RS 001			CL	0.0		0.0-1.0 Silty (fat) 6YR 6/2 to 3YR 3/1 pinkish gray to very dark gray, traces sand, traces broken lithic gravel up to 3.5 cm, low to med. plasticity, traces organics moist.
			002	RS 001				1.0		
			003	RS 001			SM	2.0		1.0-3.2 Silty Sand, color A/A, med. very fine to fine, some coarse subangular, silty, trace clay, trace gravel A/A, trace caliche, dry
			004	RS 001				3.0		3.2-4.0 No Recovery
								4.0		
								5.0		
			99A 4850	001	RS 001	RI		6.0		
				002	001	(002)		7.0		
				003	001	(002)		8.0		
				004	001	(002)		9.0		

NOTES: General: USCS is modified for this log as follows:

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(1) Badly broken core, accurate footage measurements not possible.

(2) Core breaks cannot be matched, accurate footage measurements not possible.

Procedure No. RMRS/OPS-PRO.101

Revision 0

Date effective: 12/31/98

Page 27 of 28

## ROCKY FLATS PLANT BOREHOLE LOG

PAGE 1 OF 1

Borehole Number: BH93598  
 Location - North: 748977 East: 2085978  
 Date: 3/23/98  
 Geologist: J. B. R. KOEHLER  
 Drilling Equip.: Geoprobe

Surface Elevation: 5973 ft  
 Area: 903 PAD/LIP Area  
 Total Depth: 2.5 ft.  
 Company: Tierra Project No.: GE600000  
 Sample Type: Continuous Core

## EG&amp;G LOGGING SUPERVISOR

APPROVAL Mark WardDATE 8/25/98

TOPOGRAPHY OF CORE H/BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE INTERVAL (FIELD MEASUREMENT)	SAMPLE NUMBER	FIXTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	SOIL/ LITHOLOGIC LOG	SAMPLE DESCRIPTION
Box 1 of 1 0.0-2.5 ft	Run #1 0.0-2.5 ft.	Recovery 1.4 ft.	1.001	10:34				0.0		0.0-0.4 Clay Sand, w/abundant root hairs, dark brown (10YR 3/3), fine sand, soft clumps, moist to wet.
			1.002	04				0.4		
			1.003	10:32						0.4-1.4 Clay, Sandy Gravel, dark reddish brown (2.5YR 3/4) fractured granitic IRF up to 3cm in clay sand matrix, angular medium sand, massive, minor root hairs, moist, firm.
			1.004	10:30				1.0		
			1.005	12				1.4		1.4-2.5 No Recovery
			1.006	20:14				1.5		
			1.007	10:28				2.0		
			1.008	20:14				2.5		
			1.009	10:42	Rinse 40ml. 1 gell.			3.0		T.D. = 2.5 ft.
			1.010					4.0		
								5.0		
								6.0		
								7.0		
								8.0		
								9.0		
								10.0		

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(1) Badly broken core, accurate footage measurements not possible

(2) Core breaks cannot be matched, accurate footage measurements not possible

## ROCKY FLATS PLANT BOREHOLE LOG

PAGE 1 OF 1

Borehole Number: BH93698Surface Elevation: 5972 ftLocation - North: T48988 East: 2086153Area: 903 PAD/LIP AreaDate: 3/12/98Total Depth: 2.5 ft.Geologist: R. KOEHLERCompany: TIERRAProject No.: GE600000Drilling Equip.: GEOPROBESample Type: CONTINUOUS CORE

EG&amp;G LOGGING SUPERVISOR


APPROVAL

M. Wood

DATE

4/14/98

## SAMPLE DESCRIPTION

TOP/BOTTOM OF CORE HOLE	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL (FIELD MEASUREMENT)	SAMPLE NUMBER	FLUORESCENCE AIR	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	SOIL/ LITHOLOGIC LOG	SAMPLE DESCRIPTION
Box lot 1 0.0-2.5 ft.	Run #1 0.0-2.5 ft.	Recovery 2.1 ft.	1.009 1.002 1.005 1.004 1.010 1.003 1.006 1.001 1.008	RS R RS R R-Du RS R RS R 2.0			GC	0.5 0.8 1.0 1.5 2.0 2.1 2.5		0.0-0.8 ft; Clay, Sand, Gravel; dark brown (7.5YR 3/2), quartzite gravel up to 3 cm, fractured, fine sand, clumpy, plastic, grass shoots and root hairs, moist. 0.8-2.1 ft; Clay, Sand with some gravel (1.4 to 2.1 ft), reddish yellow (5YR 7/6) fine sand, crumbly to unconsolidated, gravel is fractured, quartzite, moist. 2.1-2.5 ft. No Recovery
			1.009 1.012	RS R	RNS RNS	40 ml VOA VIAL 1 gal. poly.				T.D. = 2.5 ft.

NOTES: General: USCS is modified for this log as follows:

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(2) Core breaks cannot be matched, accurate footage measurements not possible.

## ROCKY FLATS PLANT BOREHOLE LOG

PAGE 1 OF 1

Borehole Number: BH93798  
 Location - North: 748976 East: 2086300  
 Date: 3/12/98  
 Geologist: Benton R. Koehler  
 Drilling Equip.: Geoprobe

Surface Elevation: 5970 ft  
 Area: 903 Lip Area  
 Total Depth: 2.5 ft  
 Company: Tierra Project No.: GE600000  
 Sample Type: Continuous core Macrocore

EG&amp;G LOGGING SUPERVISOR

APPROVAL

Mark Ward

DATE

3/25/98

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL (FIELD MEASUREMENT)	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	SOIL LITHOLOGIC LOGS	SAMPLE DESCRIPTION
Box 1 of 1 0.0-2.5 ft	Run #1 0.0-2.5 ft.	Recovery 1.8 ft.	1.001	R <sub>s</sub>			GC	0.0		0.0-0.4 ft Clay, Sand, Gravel, dark brown (7.5YR 3/2) Gray fractured gravel up to 3 cm, quartzite may be Some granitic IRFS, clumpy or clotty, plastic, wet to moist, root hairs. 0.4-1.8 ft.; Clay Sand Gravel, yellow (10YR 7/6), gravel concentrated at top (0.4-0.6 ft) 1 piece rounded quartzite rest is fractured quartzite gravel to 3 cm, possibly caliche?, possible clay clasts, wet to moist. No Recovery 1.8-2.5 ft
			1.002	R <sub>s</sub> 0.45				0.4		
			1.003	R <sub>s</sub>				0.5		
			1.004	R						
			1.005	R <sub>s</sub> 0.9				1.0		
			1.006	R <sub>s</sub> 1.35				1.5		
			1.007	R <sub>s</sub>				1.8		
			1.008	R <sub>s</sub> 1.8				2.0		
								2.5		T.D. = 2.5 ft.
								3.0		
								4.0		
								5.0		
								6.0		
								7.0		
								8.0		
								9.0		
								0.0		

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(2) Core breaks cannot be matched, accurate footage measurements not possible.

## ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE BOREHOLE LOG

PAGE 1 OF 1Borehole Number: BH 93898Surface Elevation: 5968 FtLocation - North: 749003 East: 2086406Area: 903 PAD Lip AreaDate: 2-17-99Total Depth: 3.9'Geologist: T. LUTHERERCompany: TERRAProject No. GE660000Drilling Equip.: GEO PROBE DUAL WALLSample Type: CONTINUOUS

RMRS LOGGING SUPERVISOR

APPROVAL

Mark R. WoodDATE 7-2-99

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL MEASUREMENT	SAMPLE NUMBER	FLAC LINE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	SOIL/ LITHOLOGIC LOG	SAMPLE DESCRIPTION
Box 1 of 1	0.0 - 3.9'	Recovery: 3.9'	001	RS	001		CL	0.0		No "dots" FOR CL SYMBOL 0.0-1.0 Sandy Clay, Dark Reddish Brown 37R 3/4, slightly plastic, some good fine to coarse sand, angular - subrounded, trace angular to subrounded up to 3 cm lithic gravel. Moist 1.0-3.7 Clayey Sand color and components same as above. damp 3.7-3.9 Gravelly Sand color and components same as above dry 3.9-4.0 No Recovery
			002	RS	002		CL	0.5		
			003	RS	003		CL	1.0		
			004	RS	004		CL	1.5		
Run #1	0.0 - 4.0'	Recovery: 3.9'	001	RS	001		SC	2.0		
			002	RS	002		SC	2.5		
			003	RS	003		SC	3.0		
			004	RS	004		SC	3.5		
99A4852			001	RS	001		GW	4.0		
			002	RS	002		GW	4.5		
			003	RS	003		GW	5.0		
			004	RS	004		GW	5.5		
			001	RS	001		GW	6.0		
			002	RS	002		GW	6.5		
			003	RS	003		GW	7.0		
			004	RS	004		GW	7.5		
			001	RS	001		GW	8.0		
			002	RS	002		GW	8.5		
			003	RS	003		GW	9.0		
			004	RS	004		GW	9.5		

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Materials amounts are estimated by % volume instead of % weight.

(1) Badly broken core, accurate footage measurements not possible.

(2) Core breaks cannot be matched, accurate footage measurements not possible.

Procedure No. RMRS/OPS-PRO.101

Revision 0

Date effective: 12/31/98

Page 27 of 28

## ROCKY FLATS PLANT BOREHOLE LOG

PAGE 1 OF 1

Borehole Number: BH 93998  
 Location - North: 749123 East: 208600  
 Date: 3/16/98 RPK 3/17/98  
 Geologist: Barton R. KOEHLER  
 Drilling Equip.: Geoprobe

Surface Elevation: 5973 ft  
 Area: 903 Lip Area  
 Total Depth: 2.5 ft  
 Company: Tierra Project No.: GE600000  
 Sample Type: Continuous core Macro Core

## EG&amp;G LOGGING SUPERVISOR

APPROVAL

Mark WardDATE 8/25/98

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL (FIELD MEASUREMENT)	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	SOIL/ LITHOLOGIC LOG	SAMPLE DESCRIPTION
Box lot 1 0.0-2.5 ft	Run #1 0.0-2.5 ft	Recovery 2.2 ft.	1.001	Rs	12:02		GC	0.0		0.0-0.4 ft; Clay Sand Gravel; dark brown (10YR 4/3 + 0.3/3); rounded spherical gravel up to 3 cm, granitic IRF possibly some quartzite, medium sandy, well graded, loose sand at top, more clumpy at bottom, top dry, bottom moist, occasional roots. 0.4-1.7 ft; Clay Sand Gravel; yellowish red (5YR 4/6) to dark yellowish brown (10YR 3/4), fractured gravel (granitic IRF) in clay sand matrix, fine sand gravel to 3 cm, well graded, clumpy or clotty, moist, trace roots at top. 1.7-2.2 ft; Clay Sand; yellow brown (10YR 5/4) to very pale brown (pyr 8/4), fine sand, clay clasts (to 1.5 cm), possibly caliche, clumpy, poor grade, moist. 2.2-2.5 ft No Recovery.
			1.002	R				0.4		
			1.003	Rs				0.5		
			1.004	R	12:00			1.0		
			1.005	Rs	11:58			1.5		
			1.006	R				1.7		
			1.007	Rs	11:56		SC	2.0		
			1.008	R				2.2		
								2.5		T.D. = 2.5 ft.
								3.0		
								4.0		
								5.0		
								6.0		
								7.0		
								8.0		
								9.0		
								0.0		

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(2) Core breaks cannot be matched, accurate footage measurements not possible.

PAGE 1 OF 1

## ROCKY FLATS PLANT BOREHOLE LOG

Borehole Number: BH94098Surface Elevation: 5971 ftLocation - North: 749117 East: 2086128Area: 903 Cip AreaDate: 03/03/98Total Depth: 2.0 ft.Geologist: ~~J. Barton~~ R. KOEHLERCompany: Tierra Project No.: GE600000Drilling Equip.: GeoprobeSample Type: Continuous Core (MACROCORE)

## EG&amp;G LOGGING SUPERVISOR

APPROVAL Mark WoodDATE 3/25/98

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE INTERVAL MEASUREMENT	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	SOIL/ LITHOLOGIC LOG	SAMPLE DESCRIPTION
0.0-2.0 ft.	Run #1	0.0-2.0 ft.	1.001				GM	0.0		0.0-0.5'; Silt, Sand, Gravel; dark yellowish brown (10R 4/2), fine to medium sand, well graded, unconsolidated, dry. Abundant root hair.
			1.002	0.5 ft	mw 7/12/97			0.5		
			1.003	0.8	mw 7/12/97		GC	1.0		0.5-2.0 ft; moderate reddish brown (10R 4/6) Clay, silt, sand, gravel; gravel up to 3 cm mostly quartzite - fractured, fine gravel and sand granitic in part, slightly plastic - forms sausage in core barrel moist, root hairs common, not stratified, gravel lenses at top, filled by coarse gravel.
			1.004	1.0 ft	mw 7/12/97					
			1.005	1.2	mw 7/12/97					
			1.006	1.5 ft	mw 7/12/97					
			1.007							
			1.008	1.5 ft				2.0		No Recovery 1.5-2.0 ft.
			2.0							
			1.010	= Rad Iso Equipment Rinse						
								3.0		
								4.0		
								5.0		
								6.0		
								7.0		
								8.0		
								9.0		
								0.0		

NOTES: General: USCS is modified for this log as follows:

Materials amounts are estimated by % volume instead of % weight.

(1) Badly broken core, accurate footage measurements not possible.

(2) Core breaks cannot be matched, accurate footage measurements not possible.



## ROCKY FLATS PLANT BOREHOLE LOG

PAGE 1 OF 1Borehole Number: BH94198Surface Elevation: 5969 ft.Location - North: 749123 East: 2086298Area: 903 Lip AreaDate: 3/16/98Total Depth: 2.5 ftGeologist: J. Baylon R. KOEHLERCompany: Terra Project No.: GE600000Drilling Equip.: GeoprobeSample Type: Continuous core Macrocore

EG&amp;G LOGGING SUPERVISOR

APPROVAL

Mark WoodDATE 8/25/98

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL (FIELD MEASUREMENT)	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	SOIL LITHOLOGIC LOG	SAMPLE DESCRIPTION
Box 1 of 1 0.0-2.5 ft	Run #1 0.0-2.5 ft	Recovery 1.6 ft	1.001 Rs				GC	0.0		0.0-0.8 Clay Sand Gravel; dark brown (7.5 YR 3/2) gravel up to 2 cm, rounded, quartz and IRF, well graded, medium grn sand, rounded?; fractured 3 cm gravel at base, clumpy, friable, moist
			1.002 R					0.5		
			1.003 Rs					1.0		0.8-1.6 Clay Sand Gravel; root hair abundant
			1.004 R					1.5		less gravel than above, pink (7.5 YR 8/3) gravel
			1.005 Rs					1.6		fractured, to 2 cm, friable fine sand, may be massive/caliche, clay clasts?
			1.006 R							partly cemented "chunks", poorly graded, moist, some root hairs, IRF at bottom.
			1.007 Rs							
			1.008 R					2.0		No Recovery 1.6-2.5 ft.
			1.009 Rs-Rinse			40 ml		3.0		T.D. = 2.5 ft.
			1.010 R-Rinse			1 gal.		4.0		
								5.0		
								6.0		
								7.0		
								8.0		
								9.0		
								10.0		
								11.0		
								12.0		
								13.0		
								14.0		
								15.0		
								16.0		
								17.0		
								18.0		
								19.0		
								20.0		

NOTES: General: USCS is modified for this log as follows:

Materials amounts are estimated by % volume instead of % weight.

(1) Badly broken core, accurate footage measurements not possible.

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## ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE BOREHOLE LOG

PAGE 1 OF 1

Borehole Number: RH94298Surface Elevation: 5968 ftLocation - North: 749112 East: 2086438Area: 903 PAD Lip AreaDate: 2-18-99Total Depth: 3.85Geologist: T. LUTHERERCompany: TIERRAProject No. GE600000Drilling Equip.: GEO PROBE REAL WALL MD 7/2/99Sample Type: CONTINUOUS

RMRS LOGGING SUPERVISOR

APPROVAL

Mark WoodDATE 7-2-99

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL FIELD MEASUREMENT	SAMPLE NUMBER	FINAL ANGLE	USCS SYMBOL	DEPTH IN FEET	SOIL LITHOLOGICAL LOG	SAMPLE DESCRIPTION
Box 10F1 0.0 - 3.85'	Run #1 0.0 - 4.0	Recovery: 3.85'	001	RS 001	SP	0.5		0.0-0.7 Gravelly Sand, Dark Reddish Brown, 2YR 2/5 Silty, med coarse Sand, some medium to fine, subangular to subrounded, trace to abundant up to 5mm broken angular lithic gravel, trace clay, trace organics, moist.
			002	ISO 002		1.0		
			003	RS 001	SL	1.5		0.7-3.7 Clayey Sand, color and components same as above damp. trace gravel A/A.
			004	ISO 002		2.0		
			005	ISO 001		3.0		
			006	ISO 002		3.7		
					SP	4.0		3.85-4.0 No Recovery
99A4849	Dip. Samples	Sampled on 2/26/99	001	001(002)		6.0		3.7-3.85 Gravelly Sand, color and components same as above dry.
			002	001(002)		7.0		
			003	001(002)		8.0		
			004	001(002)		9.0		
			005	001				
			006	001(002)				

NOTES: General: USCS is modified for this log as follows:

Materials amounts are estimated by % volume instead of % weight.

(1) Badly broken core, accurate footage measurements not possible.

(2) Core breaks cannot be matched, accurate footage measurements not possible.

Procedure No. RMRS/OPS-PRO.101

Revision 0

Date effective: 12/31/98

Page 27 of 28

## ROCKY FLATS PLANT BOREHOLE LOG

PAGE 1 OF 1

Borehole Number: B#94398  
 Location - North: 749129 East: 2085550  
 Date: 5/21/98  
 Geologist: R. KOEHLER  
 Drilling Equip.: GEOPROBE/MACROCORE

Surface Elevation: 5978 ft  
 Area: 903 PAD/LIP Area  
 Total Depth: 3.0 ft  
 Company: TIERRA Project No.: GE600000  
 Sample Type: CONTINUOUS CORE

EG&amp;G LOGGING SUPERVISOR

APPROVAL Mark WoodDATE 8/25/98

TOP OF CORE OR BOX INTERVAL	TOP OF CORE OR BOX INTERVAL	FEET OF CORE INTERVAL (FIELD MEASUREMENT)	SAMPLE NUMBER	FLUCTUATE MARK	BEDDING MARK	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	SOIL/ LITHOLOGIC LOG	SAMPLE DESCRIPTION
Box 1 of 1, 0.0-3.0 ft.	Run #1 0.0-3.0 ft.	Recovery 1.4 ft.	0001 0002 0003 0004 0005 0006 0007 0008	11:20 0.3 11:23 0.7 11:25 1.1 11:27 1.4			GM GC	0.3 0.5 0.7 1.0 1.1 1.4 1.6 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0 9.5	0.0-0.3: fill; sand and gravel, grayish brown (10YR 5/2), gravel to 2 cm, round occasionally fractured, granitic and quartzite 0.3-1.4: Soil; rock fragments, medium to fine sand, clay, sand, gravel; unconsolidated, dry, root hairs. very dark brown (10YR 2/2), gravel to 3.5 cm, angular-fractured, granitic in part, medium sand (R-o), poorly graded, Caliche 1.3-1.4 ft, firm, unconsolidated, slightly moist.	
										No Recovery 1.4-3.0 ft.
										T.D = 3.0 ft.

NOTES: General: USCS is modified for this log as follows:

Materials amounts are estimated by % volume instead of % weight.

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(2) Core breaks cannot be matched, accurate footage measurements not possible.

## ROCKY FLATS PLANT BOREHOLE LOG

PAGE 1 OF 1

Borehole Number: BH94498  
 Location - North: 749264 East: 2085552  
 Date: 06/08/98  
 Geologist: R. KOEHLER  
 Drilling Equip.: GEOPROBE/MACROCORE

Surface Elevation: 5976 ft  
 Area: 903 PAD/LIP Area  
 Total Depth: 3.0 ft.  
 Company: TIERRA Project No.: GE600000  
 Sample Type: CONTINUOUS CORE

EG&amp;G LOGGING SUPERVISOR

APPROVAL Mark WoodDATE 8/25/98

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE INTERVAL FIELD MEASUREMENT	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	SOIL/ LITHOLOG. LOG	SAMPLE DESCRIPTION
Box 1 of 1 0.0-3.0 ft.	Run #1 0.0-3.0 ft.	Recovery 1.8 ft.	001	12:10				0.3		0.0-0.3 ft.; clay, sand, gravel; dark brown (5YR 3/2), gravel upto 2cm, rounded, fractured, granitic common, subbed (clay) medium sand, unconsolidated, moist, not hard and plastic
			002	0.3				0.5		0.3-1.2 ft. soil; clay, sand, gravel; dark brown (7.5YR 3/2), gravel upto 3cm, angular-fractured, quartzite common, fine caliche (?) in lower half, slightly moist
			003	12:08				2.8		
			004	0.8				1.0		
			005	12:06				1.3		1.2-1.8 ft. Soil; Clay-Sand, trace gravel, yellow to yellowish brown (10YR 8/6 to 10YR 6/6), fine to medium sand, soft unconsolidated, slightly moist, 1 cm dia black subround gravel
			006	1.3				1.5		
			007	12:04				1.8		
			008	1.8				2.0		
								2.5		No Recovery 1.8-3.0 ft.
								3.0		
								3.5		
								4.0		T.D. = 3.0 ft.
								4.5		
								5.0		
								5.5		
								6.0		
								6.5		
								7.0		
								7.5		
								8.0		
								8.5		
								9.0		
								9.5		

NOTES: General: USCS is modified for this log as follows:

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## ROCKY FLATS PLANT BOREHOLE LOG

PAGE 1 OF 1

Borehole Number: BH94598Surface Elevation: 5976 ftLocation - North: 749265 East: 2085703Area: 903 Lip AreaDate: Drilled: 9-16-98 Sampled: 9-17-98Total Depth: 3.0 feetGeologist: R. RuppCompany: STOLLER Project No.: GE 600000Drilling Equip.: GeoprobeSample Type: Continuous Core

EG&amp;G LOGGING SUPERVISOR

APPROVAL Mark WoodDATE 9/30/98

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL (FIELD MEASUREMENT)	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	SOIL LITHOLOGIC LOG	SAMPLE DESCRIPTION
Box 1 of 1 0.0-3.0 ft.	Run #1 0.0-3.0 ft.	Recovery 2.4 ft.	1.001	1029	RS		GM	0.5	••••	0.0 - 0.5 Fill, 60% gravel 40% sand, light yellowish brown (2.5y 6/4), 80% medium to coarse sand, gravel minus 0.5 inch subrounded to rounded, dry
			1.005	0.5	R				••••	
			1.002	1033	RS				••••	
			1.006	1.0	R		GP	1.0	••••	1.0 - 1.5 Gravel, 90% gravel, 10% sand/rock fragments, poorly graded 1/8 to 1 inch, pinkish gray (5yR 7/2), subrounded to angular, broken, dry
			1.003	1022	RS				••••	
			1.007		R			1.5	••••	
			1.004	15	RS				••••	
			1.008	1036	R		GC	2.0	••••	1.5 - 2.4 Gravel-Clay-Sand, predominant gravel top and bottom, clay sand center, reddish brown (5yR 5/3) gravel subangular moderately graded, mainly sand and clay 2.0 - 2.3 ft., damp
			1.009	20	R Dup			2.5	••••	2.4 - 3.0 No Recovery
								3.0	••••	
			2.001	RS	RNS	40ml	1043			T.D. = 3.0 ft.
			2.002	R	RNS	4L	1043			

NOTES: General: USCS is modified for this log as follows

Materials amounts are estimated by % volume instead of % weight.

(1) Badly broken core, accurate footage measurements not possible

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## ROCKY FLATS PLANT BOREHOLE LOG

PAGE 1 OF 1

Borehole Number: BH 94698  
 Location - North: 749265 East: 2085852  
 Date: Drilled: 9-16-98 Sampled: 9-17-98  
 Geologist: R. Rupp  
 Drilling Equip.: Genprobe

Surface Elevation: 5975 ft  
 Area: 903 Lip  
 Total Depth: 2.0 ft.  
 Company: STOLLER Project No.: GE600000  
 Sample Type: continuous core

EG&amp;G LOGGING SUPERVISOR

APPROVAL Mark WoodDATE 9-30-98

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL (FIELD MEASUREMENT)	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	SOIL/ LITHOLOGIC LOG	SAMPLE DESCRIPTION
Box 1 of 1 0.0 - 2.0 ft.	Run 1 of 1 0.0 - 2.0 ft.	Recovery 1.8 ft.	1.001 1.005 1.002 1.006 1.003 1.007 1.004 1.008	1408 0.45 1409 0.9 1410 1.35 1411 1.80	RS R RS R RS R RS R		GC	0.5 1.0 1.5 1.8 2.0	<div>●/● ○/○ ○/○ ○/○ ○/○</div>	0.0 - 1.8 Clayey Sandy Gravel, 30% clay 50% Sand 20% gravel, Reddish gray (5YR 5/2) 80% of sand is medium to coarse grain, gravel is subrounded to angular and broken, with fragments less than 0.1 ft. diameter, well graded Loose, dry. 0.2 ft. of caliche @ 1.5 ft.
									<div>1.8 2.0</div>	1.8 - 2.0 No Recovery
										T.D. = 2.0 ft. Refusal

NOTES: General: USCS is modified for this log as follows:

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## ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE BOREHOLE LOG

PAGE 1 OF 1Borehole Number: BH94798Surface Elevation: 5972 FtLocation - North: 749266 East: 2086000Area: 903 PAD Lip AreaDate: 3-17-99Total Depth: 4.0Geologist: T. LUTHERERCompany: TIERRAProject No. GE600000Drilling Equip.: GEO PROBESample Type: CONTINUOUS

RMRS LOGGING SUPERVISOR

APPROVAL

Mark WoodDATE 7-2-99

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL FIELD MEASUREMENT	SAMPLE NUMBER	FRAGILE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	SOLV LITHOLOGIC LOG	SAMPLE DESCRIPTION
Box 10x1	Run # 1 0.0 - 4.0'	Recovery 4.0'	001	RS	001		LL	0.0		0.0-1.0 Sandy Silty Clay. very dark gray, 3YR N3 medium plasticity, trace up to 3.5 cm broken lithic gravel with organics, trace fine to coarse sand damp.
			002	RS	001			1.0		
			003	RS	001			2.0		
			004	RS	001			3.0		
			001	RS	001		SC	4.0		1.0-4.0 clayey sand. Reddish yellow to gray 7YR 7/8 to 6YR 6/8 med. to fine to fine, some medium and coarse, subangular to angular, slight plastic clay blks. locally, gravel up to 6 cm A/A, silty damp.
			002	RS	001			5.0		
			003	RS	001			6.0		
			004	RS	001			7.0		
			001	RS	001			8.0		
			002	RS	001			9.0		
			003	RS	001					
			004	RS	001					

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(2) Core breaks cannot be matched, accurate footage measurements not possible.

Procedure No. RMRS/OPS-PRO.101

Revision 0

Date effective: 12/31/98

Page 27 of 28

## ROCKY FLATS PLANT BOREHOLE LOG

PAGE 1 OF 1

Borehole Number: BH 94898Surface Elevation: 5970 ftLocation - North: 749243 East: 2086149Area: 903 LipDate: drilled: 9-23-98 sampled: 9-25-98Total Depth: 2.6 ft.Geologist: R. RuppCompany: STOLLERProject No.: G5600000Drilling Equip.: GeoprobeSample Type: continuous Core

EG&amp;G LOGGING SUPERVISOR

APPROVAL

Mark Wood

DATE

9-30-98

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL (FIELD MEASUREMENT)	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	SOIL LITHOLOGIC LOG	SAMPLE DESCRIPTION
Box 1 of 1 0.0 - 2.6 ft.	Run #1 0.0 - 2.6 ft.	RECOVERY 2.0 ft.	1.001	1412	RS		GM	0.5	• • • • •	0.0-1.0 Silt, sandy, gravelly 60% silt, 20% sand, 20% gravel, light gray (Syr 6/1) medium to very coarse sand, subrounded gravel, broken quartzite, poorly graded, loose, dry, with abundant roots to 0.2 ft.
			1.005	0.5	RS					
			1.002	1414	R					
			1.006	10	RS					
			1.003	1410	R		GC	1.5	• • • • •	1.0-2.0 Gravel, clayey, silty, 50% gravel, 25% sand, 25% clay; reddish gray (Syr 5/2) to reddish brown (Syr 4/3) poorly graded coarse sand and gravel; broken rock up to 0.15 ft. diameter; 0.3 ft clayey section at 1.7-2.0 ft. minor to no gravel, loose, dry, clay section damp.
			1.007	15	RS					
			1.004	1406	R					
			1.008	20	R					
								2.5	X	2.0-2.6 NO RECOVERY
								2.6		
										T.D. = 2.6 ft.

NOTES: General: USCS is modified for this log as follows:

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## ROCKY FLATS PLANT BOREHOLE LOG

PAGE 1 OF 1

Borehole Number: BH 94998Surface Elevation: 5968 ftLocation - North: 749244 East: 2086298Area: 903 LipDate: drilled: 9.23.98 sampled: 9.28.98Total Depth: 2.0 ft.Geologist: R. RuppCompany: STOLLER Project No.: GE-600000Drilling Equip.: GeoprobeSample Type: CONTINUOUS CORE

EG&amp;G LOGGING SUPERVISOR

APPROVAL

Mark WoodDATE 9-30-98

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL (FIELD MEASUREMENT)	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	SOIL LITHOLOGIC LOG	SAMPLE DESCRIPTION
Box 1 of 1 0.0 - 2.0 ft.	Run #1 0.0 - 2.0 ft.	Recovery 1.7 ft.	1.001	1022	NS		GM	0.5	• • •	0.0 - 0.7 Silty sand/gravel, 60% sand, 35% silt, 5% gravel, dark grayish brown (10yr 4/2) low plasticity, 80% medium to coarse sand, subrounded gravel to 0.1 ft diameter, poorly graded, loose, dry, lots of roots
			1.005	0.4	R			0.7	• • •	
			1.002	1021	NS		GP	1.0	• • •	0.7 - 1.3 GRAVEL, sandy; 80% gravel, 20% sand, silt; light brownish gray (10yr 6/2) low plasticity, sand coarse, gravel subangular and broken, poorly graded, loose, dry
			1.026	0.8	R			1.3	• • •	
			1.003	1023	NS		GC	1.5	• • •	1.3 - 1.7 Gravel, clay, sandy, 55% gravel, 25% clay, 20% sand, reddish brown (5yr 4/3) coarse sand, angular gravel, loose, dry
			1.007	1.2	R			1.7	• • •	
			1.004	1024	NS			1.7	• • •	
			1.008	1.7	R			2.0	• • •	1.7 - 2.0 No Recovery
										T.D. = 2.0 ft. Refusal

NOTES: General: USCS is modified for this log as follows:

Materials amounts are estimated by % volume instead of % weight.

(1) Badly broken core, accurate footage measurements not possible.

(2) Core breaks cannot be matched, accurate footage measurements not possible.

## ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE BOREHOLE LOG

PAGE 1 OF 1Borehole Number: BH 95098Surface Elevation: 5967 FtLocation - North: 749243 East: 2086447Area: 903 PAD Lip AreaDate: 2-9-99Total Depth: 3.4'Geologist: T. LUTHERERCompany: TERRAProject No. GE600000Drilling Equip.: GEO PROBE ADAL WALL 7/2/99Sample Type: CONTINUOUS

RMRS LOGGING SUPERVISOR

APPROVAL Mark WoodDATE 7-2-99

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL (FIELD MEASUREMENT)	SAMPLE NUMBER	FUNCTIONAL ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	SON/ LITHOLOGICAL UNIT	SAMPLE DESCRIPTION
Box 1 of 1	0.0 - 3.4'	0.0 - 4.0'	001	RS	001		SC	1.5		0.0-0.5 clayey silty sand, pink yellowish brown 3/4 very fine to fine sand, locally medium to coarse, subangular to subrounded silty, clayey, slightly plastic, w/ traces broken vitric gravel up to 3mm some organics, moist. 0.5-2.2 Gravelly silty clay, dark red, 3/4 R 3/4, trace sand A/A, trace to fine gravel A/A, slightly to moderately plastic moist 2.2-3.4 Gravelly silty sand pink to light reddish brown, gravel A/A 3.4-4.0 No Recovery
				ISO	002					
			002	RS	001			1.0		
				ISO	002					
			003	RS	001		CL	1.5		
				ISO	002					
			004	RS	001			2.0		
				ISO	002					
								2.2		
								3.0		
			99A4851	RS	001 (002)			5.0		Sand same as @ 0.0-0.5 trace clay, dry.
				002	001 (002)					
				003	001 (002)					
				004	001 (002)					
								6.0		
								7.0		
								8.0		
								9.0		

NOTES: General: USCS is modified for this log as follows:

Materials amounts are estimated by % volume instead of % weight.

(1) Badly broken core, accurate footage measurements not possible.

(2) Core breaks cannot be matched, accurate footage measurements not possible.

Procedure No. RMRS/OPS-PRO.101

Revision 0

Date effective: 12/31/98

Page 27 of 28

## ROCKY FLATS PLANT BOREHOLE LOG

PAGE 1 OF 1

Borehole Number: BH 95198Surface Elevation: 5970 ftLocation - North: 749188 East: 2086149Area: 903 LIPDate: drilled: 9-17-98 sampled: 9-24-98Total Depth: 2.7 ft.Geologist: R. RuppCompany: STOLLER Project No.: GE-600000Drilling Equip.: GeoprobeSample Type: Continuous Core

EG&amp;G LOGGING SUPERVISOR

APPROVAL Mark WoodDATE 9-30-98

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL (FIELD MEASUREMENT)	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	SOIL/LITHOLOGIC LOG	SAMPLE DESCRIPTION
Box 1 of 1 0.0 - 2.7 ft.	Run #1 0.0 - 2.7 ft.	Recovery 2.4 ft.	1.001	1433	RS		GM	0.5	• • •	0.0 - 0.5 Silty GRAVEL, brown (7.5yr 5/3) TO GRAY (7.5yr 5/3) 60% silt 10% sand 30% gravel, coarse sand, subrounded gravel, well graded, dry, ROOTS
			1.005	0.5	RS		GM	1.0	• • •	0.5 - 1.0 Silty Gravel, 70% gravel 30% silt, brown (7.5yr 5/3) subrounded to angular gravel, 0.1 ft. broken rock fragments, fines are mainly broken rock, poorly graded, dry
			1.002	1434	R			1.5	0/0	1.0 - 2.4 Clay, sandy, gravelly; 40% clay, 30% sand, 30% gravel, dark brown (7.5yr 4/3) Low Plasticity, sand grains medium to coarse, loose, dry; gravel fractured and angular
			1.006	1.0	RS		GC	2.0	0/0	2.4 - 2.7 NO Recovery
			1.003	1435	R			2.5	0/0	
			1.007	1.5	RS			2.7	0/0	
			1.004	1436	R					
			1.008	2.0	R					
										T.D. = 2.7 ft.

NOTES: General: USCS is modified for this log as follows:

Materials amounts are estimated by % volume instead of % weight.

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(2) Core breaks cannot be matched, accurate footage measurements not possible.

## ROCKY FLATS PLANT BOREHOLE LOG

PAGE 1 OF 1

Borehole Number: BH 95298Surface Elevation: 5972 ftLocation - North: 749123 East: 3086066Area: 903 LipDate: Drilled: 9.23.98 sampled: 9.28.98Total Depth: 2.95 ft.Geologist: R. RuppCompany: STOLLERProject No.: GE 600000Drilling Equip.: GeoprobeSample Type: CONTINUOUS CORE

EG&amp;G LOGGING SUPERVISOR

APPROVAL

Mark Wood

DATE

9/30/98

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL MEASUREMENT	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	SOIL LITHOLOGIC LOG	SAMPLE DESCRIPTION
Box 1 of 1 0.0 - 2.95 ft. RUN #1 0.0 - 2.95 ft. Recovery 2.6 ft.			1.001		RS					0.0-0.9 Silty, Sandy Gravel; 40% sand, 40% silt, 20% gravel dark gray (10yr 4/1) medium to coarse sand; gravel is minus 1/2 inch, rounded, pebbly, loose, dry, abundant roots to 0.5 ft.
			1.005	1108	R		GM	0.5		
			1.002	05	RS					
			1.006	1109	R			1.0		
			1.003	40	RS		GP		0.00	
			1.007	1325	R			1.5	0.00	
			1.004	15	RS					
			1.008	1327	R		GC	2.0	10/9	
			1.009	20	R Dup			2.2	10/9	
							CL	2.5		
			2.001	R	RNS	4L	1335	2.6		2.2-2.6 Caliche, sandy, gravelly; 50% fines 20% gravel pebbles, pinkish white (5yr 8/2) to white (5yr 8/1); rounded pebbles, friable, compact, dry
			2.002	RS	RNS	40ml	1337	2.95		2.6-2.95 No Recovery
										T.D = 2.95 ft.

NOTES: General: USCS is modified for this log as follows:

Materials amounts are estimated by % volume instead of % weight.

(1) Badly broken core, accurate footage measurements not possible

(2) Core breaks cannot be matched, accurate footage measurements not possible.

PAGE 1 OF 1

Surface Elevation: 5970 Ft

Area: 903 PAD Lip Area

Total Depth: 4.0' TAL 3.8

Company: TERRA <sup>7/6/29</sup> Project No. GE660000

Sample Type: CONTINUOUS

APPROVAL Mark Ward

DATE 7-2-99

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL (FIELD MEASUREMENT)	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLER	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	SOIL/ LITHOLOGIC LOGS	SAMPLE DESCRIPTION
Box 1061 0.0 - 3.2'	Run # 1 0.0 - 3.8'	RECOVERY: 3.2'	001 RS ISO 002				SM	1.5		0.0-1.0 Silty Sand very dark greyish brown 3TB 3/2 pred very fine to fine some medium to coarse, subangular, siltier, some to trace clay, some up to 6cm, subangular, dry
			002 RS ISO 002				SC	1.0		1.0-3.2 clayey sand/fine clay mottled light brownish gray to reddish brown 4YR 4/3 → 6YR 6/2 pred. very fine to fine some med + coarse, subangular, low plasticity, clay; trace to some up to 4 cm gravel dry
			003 RS ISO 002					1.5		3.2-3.8 No RECOVERY
			004 RS ISG 002					2.0		
								3.0		
								4.0		
								5.0		
								6.0		
								7.0		
			99A 6157 es RI 001 001 (002) 002 001 (002) 003 001 (002) 004 001 (002)					8.0		
								9.0		
			SAMPLED ON 3-26-99							

Procedure No. RMRS/OPS-PRO.101

Revision 0

Date effective: 12/31/98

Page 27 of 28

## ROCKY FLATS PLANT BOREHOLE LOG

PAGE 1 OF 1

Borehole Number: BH 95498  
 Location - North: 748 987 East: 2086078  
 Date: Dilled: 9-23-98 sampled: 9-28-98  
 Geologist: R. Rupp  
 Drilling Equip.: Genprobe

Surface Elevation: 5973 ft  
 Area: 903 Lip  
 Total Depth: 2.35 ft.  
 Company: STOLLER Project No.: GE600000  
 Sample Type: continuous core

EG&amp;G LOGGING SUPERVISOR

APPROVAL

Mark Wood

DATE

9/30/98

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL (FIELD MEASUREMENT)	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	SOIL/ LITHOLOGIC LOG	SAMPLE DESCRIPTION
BOX 1 of 1 0.0 - 2.35 ft.	Run #1 0.0 - 2.35 ft.	Recovery 1.75 ft.	1.001	1429	R <sub>s</sub>		GM	0.5		0.0-0.8 GRAVEL, SILTY, SANDY; 50% gravel 40% silt 10% sand dark grayish brown (10YR 4/2) sand medium to coarse; gravel subangular, poorly graded, loose, dry, very heavy roots
			1.005	0A5	R			0.8		
			1.002	1431	R <sub>s</sub>		GP	1.0		0.8-1.1 GRAVEL, SILTY, SAND; 55% gravel, 30% sand, 15% silt Brown (10YR 5/3) sand coarse, gravel subrounded minus 0.1 ft poorly graded, loose, dry
			1.006	0.9	R			1.1		
			1.003	1425	R <sub>s</sub>		GC	1.5		1.1-1.75 GRAVEL, clayey, sandy; 70% gravel, 20% clay 10% sand Reddish brown (5YR 4/3) angular, broken gravel, compact, dry, grading to light gray (10YR 7/1) pebbly caliche, loose dry
			1.007	1.35	R					
			1.008	1427	R <sub>s</sub>			2.0		1.75-2.35 No Recovery
				1.75	R			2.35		
										T.D. = 2.35 ft.

NOTES: General: USCS is modified for this log as follows:

Materials amounts are estimated by % volume instead of % weight.

(1) Badly broken core, accurate footage measurements not possible.

(2) Core breaks cannot be matched, accurate footage measurements not possible.

## ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE BOREHOLE LOG

PAGE 1 OF 1

Borehole Number: BH95598  
 Location - North: 748984 East: 2086229  
 Date: 3-24-99  
 Geologist: T. LUTHERER  
 Drilling Equip.: GEO PROBE DUAL WALL

Surface Elevation: 5972 Ft  
 Area: 903 PAD Lip Area  
 Total Depth: 4'  
 Company: TIERRA Project No. GE600000  
 Sample Type: CONTINUOUS

RMRS LOGGING SUPERVISOR

APPROVAL Mark WoodDATE 7-2-99

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL MEASUREMENT	SAMPLE NUMBER EVENT	FRAGILE ANGLE	TA BOTTLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	SOIL LITHOLOGIC LOG	SAMPLE DESCRIPTION
Box 1 of 1 0.0 - 2.85	Run # 1 0.0 - 4.0	RECOVERY: 2.85	001 RS ISO	001	002		SM	0.0		0.0-0.9 Clayey Silty Sand, dark yellowish brown, 3/4 R 3/4, med. very fine and fine, some med and coarse, silty, medium plasticity clay with up to 5cm angular lithic gravel, organics, damp at 8, otherwise dry
			002 RS ISO	001	002			0.4		
			003 RS ISO	001	002			1.0		
			004 RS ISO	001	002		GM	1.5		
								2.0		
								2.5		
								2.85		0.9-2.85 Gravelly Silty Sand, very pale brown 8/10 R 8/10 med. very fine to silt, some fine to coarse, with up to 4cm subangular lithic gravel 90% of material appears to be caliche dry
								3.0		
								4.0		
								5.0		
								6.0		
								7.0		
								8.0		
								9.0		

NOTES: General: USCS is modified for this log as follows:

Materials amounts are estimated by % volume instead of % weight.

(1) Badly broken core, accurate footage measurements not possible.

(2) Core breaks cannot be matched, accurate footage measurements not possible.

Procedure No. RMRS OPS-PRO.101

Revision 0

Date effective: 12/31/98

Page 27 of 28

## ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE BOREHOLE LOG

PAGE 1 OF 1Borehole Number: BH95698Surface Elevation: 5971 FtLocation - North: 749248 East: 2086077Area: 903 PAD Lip AreaDate: 3-18-99Total Depth: 4'Geologist: T. LUTHERERCompany: TIERRAProject No. GE600000Drilling Equip.: GEOPROBE DUAL WALL MWSample Type: CONTINUOUS

RMRS LOGGING SUPERVISOR

APPROVAL Mark WoodDATE 7-2-99

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL (FIELD MEASUREMENT)	SAMPLE NUMBER	FINA LURE ANGLE	7AL BRIDGING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN (FEET)	SOIL LITHOLOGIC LOG	SAMPLE DESCRIPTION
Box 1001	Run # 1	00-4.0	Recovery: 3.2'	001	RS	001				0.0-3.2 Gravelly Silty Sand, very dusky red to very pale brown 2.5 YR to 8 YR 8. 0.0-0.9 med. very fine to fine becoming coarser w/depth, trace to some organics locally clayey, trace to some sub- angular lithic gravel up to 5cm, 0.0-0.9 damp, 0.9-3.2 dry 3.2-4.0 No Recovery
				002	ISO	002				
				003	RS	001		1.0		
				004	ISO	002				
				005	RS	001				
				006	ISO	002		2.0		
				007	RS	001				
				008	ISO	002		3.0		
				009	RS	001				
				010	ISO	002		4.0		
				011	RS	001				
				012	ISO	002				
				013	RS	001				
				014	ISO	002				
				015	RS	001				
				016	ISO	002				
99A5835				001	RS	001 (002)		5.0		
				002	RS	001 (002)				
				003	RS	001 (002)		6.0		
				004	RS	001 (002)				
				005	RS	001 (002)		7.0		
				006	RS	001 (002)				
				007	RS	001 (002)		8.0		
				008	RS	001 (002)				
				009	RS	001 (002)		9.0		
				010	RS	001 (002)				
				011	RS	001 (002)				
				012	RS	001 (002)				
				013	RS	001 (002)				
				014	RS	001 (002)				
				015	RS	001 (002)				
				016	RS	001 (002)				

NOTES: General: USCS is modified for this log as follows:

Materials amounts are estimated by % volume instead of % weight.

(1) Badly broken core, accurate footage measurements not possible.

(2) Core breaks cannot be matched, accurate footage measurements not possible.

Procedure No. RMRS/OPS-PRO.101

Revision 0

Date effective: 12/31/98

Page 27 of 28



## ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE BOREHOLE LOG

PAGE 1 OF 1Borehole Number: BH95798Surface Elevation: 5970 ftLocation - North: 749268 East: 2086148Area: 903 PAD Lip AreaDate: 3-17-99Total Depth: 4'Geologist: T. LUTHERERCompany: TIERRAProject No. GE600000Drilling Equip.: GEOPROBE DUAL WALLSample Type: CONTINUOUS

RMRS LOGGING SUPERVISOR

APPROVAL

Mark WoodDATE 7-2-99

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL MEASUREMENT	SAMPLE NUMBER EVENT	FINACINE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	SOIL/ LITHOLOGIC LOG	SAMPLE DESCRIPTION
Box 1 of 1 0.0-3.3'	Run # 1 0.0-4.0	Recovery: 3.3'	001 RS 001				SC	0.0		0.0-0.8 Clayey Sand, dark brown 3YR 3/3. med fine to very fine, some medium to coarse, subangular trace slightly plastic clay, w/trace to some up to 4mm angular to subrounded lithic gravel dump.
			002 RS 001					0.8		
			003 RS 001				CL	1.0		
			004 RS 001					1.2		
			005 RS 001					2.0		
			006 RS 001				SC	3.0		
			001 RS RI					3.3		3.3-4.0, No Recover reddish yellow 6YR 6/3 to 6YR 6/8 med. fine to very fine, some medium to coarse, subangular, slight to no plasticity, with up to 4mm angular to subrounded lithic gravel dry.
			002 RS RI					4.0		
			003 RS RI					5.0		
			004 RS RI					6.0		
			005 RS RI					7.0		
			006 RS RI					8.0		
			001 RS RI					9.0		
			002 RS RI							

NOTES: General: USCS is modified for this log as follows:

Materials amounts are estimated by % volume instead of % weight.

(1) Badly broken core, accurate footage measurements not possible.

(2) Core breaks cannot be matched, accurate footage measurements not possible.

Procedure No. RMRS/OPS-PRO.101

Revision 0

Date effective: 12/31/98

Page 27 of 28

PAGE 1 OF 1

Surface Elevation: 5969 Ft

Area: 903 PAD Lip Area

Total Depth: 4.0'

Company: TERRA

Sample Type: CONTINUOUS

APPROVAL

DATE 7-2-99

NOTES: General: USCS is modified for this log as follows:  
Materials amounts are estimated by % volume instead of % weight.  
(1) Badly broken core, accurate footage measurements not possible.  
(2) Core breaks cannot be matched, accurate footage measurements not possible.

Procedure No. RMRS/OPS-PRO.101  
Revision 0  
Date effective: 12/31/98  
Page 27 of 28

## ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE BOREHOLE LOG

PAGE 1 OF 3

Borehole Number: BH5998Surface Elevation: 5976 FTLocation - North: 749140 East: 2085893Area: 903 PADDate: 6-3-99 → 6-7-99Total Depth: 25.0 FTGeologist: J. LUTHERERCompany: TIERRAProject No: GE600000Drilling Equip.: GEOPROBE DUAL WALLSample Type: CONTINUOUS

RMRS LOGGING SUPERVISOR

APPROVAL Mark WoodDATE 7-6-99

TOP/BOTTOM OF CORE HUBS	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL MEASUREMENT	SAMPLE NUMBER	FINAL CORE ANAL	INITIALS ANAL	DIAMETER DISTRIBUTION	USCS SYMBOL	DEPTH FEET	SOIL LITHOLOG LINE	SAMPLE DESCRIPTION
	Run #1: 0.0-3.8'	Recovery: 3.5'						1.0		0.0-4.0 similar to BH 90998 see log
	Run #2: 3.8-6.8'	Recovery: 3.7'	001 003 002 003	4.8 5.0 5.6	RS ISO VMA		SC	4.0 5.0 6.0 7.0		3.8-6.8 Clayey Sand, brown 7.5 YR 5/4, fine to coarse, sub- angular to subrounded, lithic sand, low plastic clay, some silt, with up to 4cm broken to subangular lithic gravel, damp
	Run #3: 6.8-8.8'	Recovery: 1.95'	001 003 002				SC	8.0 9.0		6.8-8.8 Clayey Sand, A/A
8.8-10.8	Run #4: 8.8-10.8'	Recovery: 2.4'					SC			8.8-10.8 Clayey Sand A/A

NOTES: General: USCS is modified for this log as follows:

Materials amounts are estimated by % volume instead of % weight.

(1) Badly broken core, accurate footage measurements not possible.

(2) Core breaks cannot be matched, accurate footage measurements not possible.

Procedure No. RMRS/OPS-PRO.101

Revision 0

Date effective: 12/31/98

Page 27 of 28

## ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE BOREHOLE LOG

PAGE 2 OF 3

Borehole Number: BH95998  
 Location - North: 749140 East: 2085893  
 Date: 6-3-99 → 6-7-99  
 Geologist: T. LUTHERER  
 Drilling Equip.: GEOPROBE DUAL WALL

Surface Elevation: 5976 ft  
 Area: 903 PAD  
 Total Depth: 25.0 ft  
 Company: TIERRA Project No.: 6E600000  
 Sample Type: CONTINUOUS

RMRS LOGGING SUPERVISOR

APPROVAL Mark WoodDATE 7-6-99

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL (MEASUREMENT)	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	SOIL LITHOLOGIC LOG	SAMPLE DESCRIPTION
Run #4	8.8-10.8	Recovery: 2.4					SC	10.0		Clayey Sand A/A
Run #5	10.8-12.8	Recovery: 2.8	99A7799 003				XXY	11.0		10.8-12.5 Clayey Sand
			001	12.2	RS			20		
			003	12.4	ISO					
			002	12.7	VOA					
							CL			12.5-12.8 Clay, light-yellowish brown 2.5 x 6/3 to light olive yellow, 2.5 x 6/8
Run #6	12.8-15.8	Recovery: 2.4					SC	13.0		low to no plasticity, dense, fine, w/ traces fine to coarse lithic + calcareous sand, also w/ traces fine up to 1.5 cm subrounded gravel, damp to moist.
			001	14.6	RS					
			002	14.8	VOA					
			003	15.2	ISO					
				15.4	ISO					
			99A7799 004				XXX			12.8-15.8 Clayey Sand A/A
Run #7	15.8-17.0	Recovery: 2.35					SC	16.0		15.8-17.0 Clayey Sand A/A
Run #8	17.0-18.8	Recovery: 2.45						17.0		17.0-18.8 Clayey Sand A/A
			001	17.3						
			003	17.5						
				17.7						
			002	18.2			SC	18.0		
			99A7799 005				XXY			
Run #9	18.8-20.0	Recovery: 1.2					SC	19.0		18.8-19.9 Clayey Sand A/A
										TOTAL 6-24-99
										19.9-20.0 No Recovery

NOTES: General: USCS is modified for this log as follows:

Materials amounts are estimated by % volume instead of % weight.

(1) Badly broken core, accurate footage measurements not possible.

(2) Core breaks cannot be matched, accurate footage measurements not possible.

Procedure No. RMRS/OPS-PRO.101

Revision 0

Date effective: 12/31/98

Page 27 of 28

184

# ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE BOREHOLE LOG

PAGE 3 OF 3

Borehole Number: BH95998  
Location - North: 749140 East: 2085893  
Date: 6-3-99 → 6-7-99  
Geologist: T. LUTHERER  
Drilling Equip. GEOPROBE DUAL WALL

Surface Elevation: 5976 ft  
Area: 903 PAD  
Total Depth: 25.0 ft  
Company: TIERRA Drilled: No GEG00000  
Sample Type: CONTINUOUS

RMRS LOGGING SUPERVISOR

APPROVAL Mark Wood

DATE 7-6-99

[illegible]

NOTES General: USCS is modified for this log as follows.

Materials amounts are estimated by % volume instead of % weight.

(1) Sadly broken core, accurate footage measurements not possible.

(2) Core breaks cannot be matched, accurate footage measurements not possible.

Procedure No. RMRS OPS-PRO.101.

Revision 0

Date effective: 12/31/98

Page 27 of 28

## ROCKY FLATS PLANT BOREHOLE LOG

PAGE 1 OF 2

Borehole Number: BH 960 98  
 Location - North 749211TA East: 2085612  
 Date: 10/29/98 → 11/30/98  
 Geologist: T. LUTHERER  
 Drilling Equip.: GEOPROBE - Dual Well

Surface Elevation: 5978 ft  
 Area: 903 PAD  
 Total Depth: 17.0 ft  
 Company: TIERRA Project No.: 6E600000  
 Sample Type: CONTINUOUS

EG&amp;G LOGGING SUPERVISOR

APPROVAL Mark WoodDATE 7-6-99

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL (FIELD MEASUREMENT)	SAMPLE NUMBER	FRAC- TURE ANGLE ANALYSIS	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	SOIL/ LITHOLOGIC LOG	SAMPLE DESCRIPTION
	Run #1 0.0-3.8	Recovery: 3.4						1.0 2.0 3.0 3.4		0.0-3.8 See Borehole log of BH 90098
								3.4	X	3.4-3.8 No Recovery
	Run #2 3.8-7.0	Recovery: 3.0	001 RS 007 ISO 013 VOA A 993210-002-XXX				SC	4.0 4.3 4.5 4.8 5.0		3.8-7.0 Sand; Light Brown to Strong Brown 7.5 TR 6/3 to 7.5 TR 5/6 fine to coarse, subangular to subrounded, some to abundant up to 4mm broken and subangular to angular lithic gravel, some to abundant low plastic clay, locally grading to clayey sand. Dry to damp with some powdery Caliche white; 1/8, 5 TR 8/
	Run #3 7.0-9.0	Recovery: 3.0	002 RS 008 ISO 014 VOA				SC	6.0 7.0 8.0 8.2 8.5 8.8 9.0		7.0-9.0 Sand; locally grading to clayey sand. A/A damp
	Run #4						CL			9.0-12.0 Clay A/A with sand, A/A with traces coarse, rounded Caliche sand. lithic subangular fine to coarse sand

NOTES: General: USCS is modified for this log as follows:

Materials amounts are estimated by % volume instead of % weight.

(1) Badly broken core, accurate footage measurements not possible.

(2) Core breaks cannot be matched, accurate footage measurements not possible.

186

## ROCKY FLATS PLANT BOREHOLE LOG

PAGE 2 OF 2Borehole Number: BH96098Surface Elevation: 5978 ftLocation - North: 749211 TALE East: 20B5612Area: 903 PADDate: 10/29/98 → 11/30/98Total Depth: 17.0 ftGeologist: T. LUTHERERCompany: TIERRAProject No.: GE600000Drilling Equip.: GEO PROBE DUAL WALLSample Type: CONTINUOUS

EG&amp;G LOGGING SUPERVISOR

APPROVAL Mark WoodDATE 7-6-99

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL MEASUREMENT	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	SOIL/ LITHOLOGIC LOG	SAMPLE DESCRIPTION
	Run #4 9.0-12.0	Recovery: 4.0						10.0		locally grading to sandy clay
							CL	11.0		
								12.0		
	Run #5 12.0-15.0	Recovery: 4.0	003 RS					12.3		12.0-15.0 clay; locally grading
			009 ISO					12.5		to sandy clay A/A
			74K							
			007							
			015	VOA				13.0		
							CL			
								14.0		
								15.0		
	Run #6 15.0-16.3	Recovery: 1.25	004 RS					15.6		15.0-15.8 clay; locally grading
			010 ISO					15.8		to sandy clay A/A
			016	VOA						
	Run #7 16.3-17.0	Rec: 1.25					BR	16.0		15.8-17.0
							BR	16.3		Sandstone; yellow 10YR 8/8 fine to
								16.5		medium, subangular, mostly unconsolidated.
								16.7		highly friable, oxidized, granitic, saturated
								17.0		trace clay + silt
										Bedrock contact: 15.8
										TD: 17.0
								18.0		
								19.0		

NOTES: General: USCS is modified for this log as follows:

Materials amounts are estimated by % volume instead of % weight.

(1) Badly broken core, accurate footage measurements not possible.

(2) Core breaks cannot be matched, accurate footage measurements not possible.





## ROCKY FLATS PLANT BOREHOLE LOG

PAGE 2 OF 2

Borehole Number: BH96198  
 Location - North: 749213 East: 2085687  
 Date: 12/03/98  
 Geologist: R. KOEHLER  
 Drilling Equip.: GEOPROBE - DUAL WALL

Surface Elevation: 5977 ft.  
 Area: 903 PAD  
 Total Depth: 18.8 ft.  
 Company: TIERRA Project No.: GE600000  
 Sample Type: CONTINUOUS

EG&amp;G LOGGING SUPERVISOR

APPROVAL Mark WoodDATE 7-7-99

FORMATION OR CORE ID BOX	FORMATION OF INTERVAL	FEET OF CORE INTERVAL (FIELD MEASUREMENT)	SAMPLE NUMBER	PROBABLE ANGLE	REMARKS ANAL	GRAIN SIZE DISTRIBUTION	USCS STATION	DEPTH IN FEET	SOIL THICKNESS LOG	SAMPLE DESCRIPTION
BOX 2 of 3 9.5-17.0 ft.	RUN #4 9.0-11.5 ft.	RECOVERY 4.0 ft.		XXX			SC	11.0		light reddish brown (SYR 6/4), fine to medium sand, subround to subangular, firm, slightly moist, gravel may be in lenses.
	RUN #5 11.5-14.0 ft.	RECOVERY 4.0 ft.	10:55 003 10:54 009 10:53 015	Rad S Iso VOC	11.8 12.0 12.5		SC	11.5 11.8 12.0 12.5 13.0		As above 9.5-11.5 ft. 11.5-14.0 ft.
	RUN #6 14.0-16.5 ft.	RECOVERY 3.0 ft.					6C	14.0 15.0 15.3 15.5 15.8 16.0 16.2		14.0-16.5 Similar to RUN #3 6.5-9.0 ft. Pinkish clayey-sandy gravel, quartzite gravel to 2 cm.
	RUN #7 16.5-18.8 ft.	RECOVERY 4.0 ft.						16.5 16.6 17.0 18.0 18.8 19.0		Bedrock contact 16.6 ft. 16.6-18.8 ft; Clayey sand, light yellowish brown to yellow (10YR 6/4-10YR 7/6), fine sand, firm to hard, slightly moist.
BOX 3 of 3 17.0-18.8 ft.										T D 18.8 ft.

NOTES. General: SCSS is modified for this log as follows:

Materials amounts are estimated by % volume instead of % weight.

(1) Badly broken core, accurate footage measurements not possible.

(2) Core breaks cannot be matched, accurate footage measurements not possible.

## ROCKY FLATS PLANT BOREHOLE LOG

PAGE 1 OF 2

Borehole Number: BH96298  
 Location - North: 799135 East: 2085611  
 Date: 12/04/98  
 Geologist: R. KOEHLER  
 Drilling Equip.: GEO PROBE - DUAL WALL

Surface Elevation: 5979 FT  
 Area: 903 PAD  
 Total Depth: 16.5 ft  
 Company: TIERRA Project No.: GE600000  
 Sample Type: CONTINUOUS

EG&amp;G LOGGING SUPERVISOR,

APPROVAL Mark WoodDATE 7-6-99

TOP OF CORE IN BOX	TOP OF CORE OF INTERVAL	FEET OF CORE IN INTERVAL (FIELD MEASUREMENT)	SAMPLE ID NUMBER	TEST RESULTS XXX	DEPTH IN FEET	LOG CORRECTION	SAMPLE DESCRIPTION
BOX 1 OF 2	Run #1	00-3.8 ft.	Recovery	3.1 ft.	0.0		0.0-0.4 ft: Asphalt
					0.4		0.4-3.8 ft: Clayey-sandy gravel; yellowish red (5YR 5/6), quartzite gravel up to 2 cm (most about 0.5 cm), fractured to subround, fine to medium sand - subangular to subround, firm, slightly moist,
	Run #2	3.8-6.5 ft.	Recovery	2.8 ft.	3.8		As above 0.4-3.8 ft.
					4.0		
					4.3		
					4.7		
	Run #3	6.5-9.0 ft.	Recovery	2.7 ft.	6.5		As above 0.4-3.8 ft.
					6.8		
					7.0		
					7.5		
	Run #4	9.0-11.5 ft.	Recovery	3.1 ft.	8.0		As above 0.4-3.8 ft.
					8.5		
					9.0		
					9.0		

NOTES: General: USCS is modified for this log as follows:

Materials amounts are estimated by % volume instead of % weight.

(1) Badly broken core, accurate footage measurements not possible.

(2) Core breaks cannot be matched, accurate footage measurements not possible.

## ROCKY FLATS PLANT BOREHOLE LOG

PAGE 2 OF 2

Borehole Number: BH96298  
 Location - North: 749135 East: 2085611  
 Date: 12/04/98  
 Geologist: R. KOEHLER  
 Drilling Equip.: GEOPROBE - DUAL WALL

Surface Elevation: 5979 ft  
 Area: 903 PAD  
 Total Depth: 16.5 ft  
 Company: TIERRA Project No. GE60000  
 Sample Type: CONTINUOUS

EG&amp;G LOGGING SUPERVISOR

APPROVAL Mark WoodDATE 7-6-99

POSITION OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL (FIELD MEASUREMENT)	SAMPLE INTERVAL	FLUOR. AREA	DETERG. AREA	GRAV. SIZE DISTRIBUTION	USCS SYMBOL	DEPTH (FEET)	SOIL/ LITHOLOGIC LOG	SAMPLE DESCRIPTION
				XXX						
								10.5		See previous page
								10.7		
								11.0		10.5-11.5 Clayey sand; yellowish red (5YR 5/6) fine sand, slightly plastic, slightly moist, firm.
								11.5		
								11.9		
								12.0		11.5-14.0 Clayey sand as above 10.5-11.5 ft.
								12.25		1cm gravel, subrounded from 13.5 to 14.0 ft.
								12.25		matrix is clayey sand
								12.75		
								13.0		
								14.0		14.0 ft. BEDROCK CONTACT
								15.0		14.0-16.5 Clayey sand, <sup>stone</sup> brownish yellow (10YR 6/8), fine sand, firm, slightly moist, friable
								15.7		
								15.9		
								16.0		
								16.5		16.5 ft. T.D.
								17.0		
								18.0		
								19.0		
										** On removing the outer steel core liner from the hole about 1 ft of additional cored material was found. Evidently this material fell out at the plastic core liner, some also from cutting shoe. This material was put into core box.

NOTES: General: USCS is modified for this log as follows:

Materials amounts are estimated by % volume instead of % weight.

(1) Badly broken core, accurate footage measurements not possible.

(2) Core breaks cannot be matched, accurate footage measurements not possible.

## ROCKY FLATS PLANT BOREHOLE LOG

PAGE 1 OF 2

Borehole Number: BH96398  
 Location - North: 749041 East: 2085610  
 Date: 12-7-98 → 12-8-98  
 Geologist: T. LUTHERER  
 Drilling Equip.: GEOPROBE DUAL WALL

Surface Elevation: 5979 FT  
 Area: 903 PAD  
 Total Depth: 16.5 FT  
 Company: TIERRA Project No.: 6E600000  
 Sample Type: CONTINUOUS

EG&amp;G LOGGING SUPERVISOR

APPROVAL

Mark WardDATE 7-6-99

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL MEASUREMENT	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	SOIL/ LITHOLOGIC LOG	SAMPLE DESCRIPTION
	Run #1, 0.0-3.8	Recovery: 2.7'						1.0 2.0 2.7 3.0		0.0-3.8 See Borehole log of BH 91098
	Run #2 3.8-6.5	Recovery: 3.0'	001 RS 002 ISO 003 VOA				CL	3.8 4.0 4.3 4.5 4.8 5.0		2.7-3.8 No Recovery
			99A4102-001-xxx					6.0		3.8-6.5 Sandy clay; light yellowish brown IPYR 6/4, non to low plasticity, with fine to coarse, subangular to subrounded lithic sand, trace gravel damp.
	Run #3 6.5-9.0	Recovery: 3.0'	004 RS 005 ISO 006 VOA				SL	6.5 7.0 8.0 8.2 8.4 8.5 8.9 9.0		6.5-9.0 Sand; strong brown 7.5TR 5/6 fine to coarse, subrounded to angular, locally silty to clayey, also with fine to medium sized gravel. Damp
	Run #4	Recovery: 3.1'					SC			Locally grading to clayey sand.
										9.0-11.5 clayey sand/ locally grading to:

NOTES: General: USCS is modified for this log as follows:

Materials amounts are estimated by % volume instead of % weight.

(1) Badly broken core, accurate footage measurements not possible.

(2) Core breaks cannot be matched, accurate footage measurements not possible.

192

## ROCKY FLATS PLANT BOREHOLE LOG

PAGE 2 OF 2

Borehole Number: BH 96398  
 Location - North: 749061 East: 2085610  
 Date: 12-7-98 → 12-8-98  
 Geologist: T. LUTHERER  
 Drilling Equip.: GEOPROBE DUAL WALL

Surface Elevation: 5979 ft  
 Area: 903 PAD  
 Total Depth: 16.5 ft  
 Company: TIERRA Project No.: 6E6000 00  
 Sample Type: CONTINUOUS

EG&amp;G LOGGING SUPERVISOR

APPROVAL Mark WardDATE 7-6-99

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL (FIELD MEASUREMENT)	SAMPLE NUMBER	FRAC- TURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	SOIL/ LITHOLOGIC LOG	SAMPLE DESCRIPTION
	Run #4 9.0-11.5	Rec: 3.1					SC CL	10.0 11.0		Sandy Clay A/A, damp
	Run #5 11.5-14.0	Recovery 3.3	007 008 009	RS TSO VOA			CL	12.0 12.2 12.4 12.7		12.7-TAV 11.5 to 14.0 Sandy Clay; Reddish Brown, 57 R 4/3 trace to some plasticity, with fine to coarse subangular sand (litic), locally some fine angular lithic gravel, silty day, 12.7 to 13.8 Gravelly sand; see above for constituents.
	Run #6 14.0-16.5	Recovery 3.8	010 011 012	RS TSO VOA			GM SC	13.0 14.0		13.8-14.0 Clayey Sand see above for constituents
							BR mud TLV 190	15.0 15.8 16.0 16.2 16.4		14.0-16.5 Claystone, light olive gray 57 5/2 locally weathered, mottled w/ light olive brown 57 5/6. Blocky, dense, locally silty, with some light gray N7 very fine sand. dry - wet @ 14.0-14.2
								17.0 18.0 19.0		Assumed Bedrock contact @ 14.0 Last sample lost from sampler, retrieved with dual wall. TD = 16.5'

NOTES: General: USCS is modified for this log as follows:

Materials amounts are estimated by % volume instead of % weight.

(1) Badly broken core, accurate footage measurements not possible.

(2) Core breaks cannot be matched, accurate footage measurements not possible.

143

## ROCKY FLATS PLANT BOREHOLE LOG

PAGE 1 OF 3

Borehole Number: BH 96498  
 Location - North: 749141 East: 2085910  
 Date: 10/21/98 → 10/26/98  
 Geologist: T. LUTHERER  
 Drilling Equip.: GEOPROBE DUAL WALL

Surface Elevation: 5976 FT  
 Area: 903 PAD  
 Total Depth: 23.0 FT  
 Company: VIERRA Project No.: 6E6000 00  
 Sample Type: CONTINUOUS

EG&amp;G LOGGING SUPERVISOR

APPROVAL Mark WordDATE 7-6-99

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL (FIELD MEASUREMENT)	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	SOIL/ LITHOLOGIC LOG	SAMPLE DESCRIPTION
	Run #1	0.0-3.8'						1.0		0.0-3.8 See Borehole log of BH 90998
		Recovery: 2.25'						2.0		
								2.25		
								3.0		2.25-3.8 No Recovery
								3.8		
	Run #2	3.8-7.8'						4.0		3.8-7.53 clayey Sand
		Recovery: 3.73'	001	RS		4.0		4.4		
			007	ISO		4.4	SC	4.8		
			013	VOA		4.8		5.0		
						5.2		5.2		
			99A3210	001-xxx				6.0		med. fine some coarse, subangular to subrounded, some medium, fold- spar and quartz, clayey, some silt. lenses, up to 3mm broken lithic gravel, non-low plasticity, well graded, moist
							SC	7.0		
								7.53		7.53-7.8 No Recovery
	Run #3	7.5-11.0						8.0		Repositioned Sampler to 7.5' due to soil between liner and shoe
			002	RS				9.0		7.5-11.0 Silty Gravelly Sand
			008	ISO			SM			
			014	VOA				10.0		med very fine to fine, trace med and coarse, subrounded to subangular, locally very silty, sandy clay, poorly sorted to abundant broken lithic gravel

NOTES: General: USCS is modified for this log as follows:

Materials amounts are estimated by % volume instead of % weight.

(1) Badly broken core, accurate footage measurements not possible.

(2) Core breaks cannot be matched, accurate footage measurements not possible.

144

## ROCKY FLATS PLANT BOREHOLE LOG

PAGE 2 OF 3

Borehole Number: BH 96498  
 Location - North: 749141 East: 2085910  
 Date: 10/21/98  
 Geologist: T. LUTHERER  
 Drilling Equip.: GEOPROBE DUAL WALL

Surface Elevation: 5976 Ft  
 Area: 903 PAD  
 Total Depth: 23.0 Ft  
 Company: TIERRA Project No.: 6E600000  
 Sample Type: CONTINUOUS

EG&amp;G LOGGING SUPERVISOR

APPROVAL Mark WoodDATE 7-6-99

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL (FIELD MEASUREMENT)	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	SOIL/ LITHOLOGIC LOG	SAMPLE DESCRIPTION
	Run #3						GM	10.0		7.5-11.0 Conty Gravel size A/A, traces Caliche, dry
	Run #4 11.0-14.0							11.0		11.0-14.0 Clayey Sand
			003					12.0		Same as @ 3.8-7.53 dry
			009	RS			SC	12.2		
			015	TSO				13.0		
				VOA				13.5		
	Run #5 14.0-17.0						SC	14.0		14.0-14.5 Clayey Sand same as above.
			004	RS			GM	14.5		14.5-15.9 S-Hr Gravelly Sand-
			010	TSO				15.0		Same as @ 7.5-11.0 dry
			016	VOA				15.9		15.9-16.5 Sandy Clay
							CL	16.0		Size and texture same as @
								16.5		3.8-7.53 dry. 16.5-17.0 No Recover
	Run #6 17.0-20.0							17.0		17.0-18.6 Clayey Sand same as @
							SC	18.0		11.0-14.5. Obstruction @ 18.6 which required run # 7 from 18.6-19.9
								18.6		18.6-19.9 Clayey Sand as above
								19.0		
								19.9		

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## ROCKY FLATS PLANT BOREHOLE LOG

PAGE 3 OF 3

Borehole Number: BH96498  
 Location - North: 749141 East: 2085910  
 Date: 10-21-98 → 10-26-98  
 Geologist: LUTHERER  
 Drilling Equip.: GEOPROBE DUAL WALL

Surface Elevation: 5976 FT  
 Area: 903 MAD  
 Total Depth: 23.0 FT  
 Company: TERRA Project No.: 6E6000 00  
 Sample Type: CONTINUOUS

EG&amp;G LOGGING SUPERVISOR

APPROVAL Mark WoodDATE 7-6-99

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE INTERVAL (FIELD MEASUREMENT)	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	SOIL LITHOLOGIC LOG	SAMPLE DESCRIPTION
	Run # 8 19.9-23.0	Recovery: 3.6'	006	R5			SC	20.0		19.9-22.0 Clayey Sand same as above
			012	T50				21.0		
			018	V0A				21.4		
								22.0		22.0-23.0 Silty Claystone. Top of Bedrock = 22.0 FT
							BR max 7/1/99	23.0		slightly weathered, slightly oxidized, generally blocky, dense, mgd. friable, some MgO dendritic patterns, dry
										TD = 23.0'

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(2) Core breaks cannot be matched, accurate footage measurements not possible.

196



7-7-99

## ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE BOREHOLE LOG

PAGE 1 OF 2

Borehole Number: BH96598  
 Location - North: 249147 East: 2085867  
 Date: 5-17-99  
 Geologist: J. LUTHERER  
 Drilling Equip.: GEOPROBE DUAL WALL

Surface Elevation: 5976 ft  
 Area: 903 PAD  
 Total Depth: 23.8  
 Company: TIERRA Project No. 6E600000  
 Sample Type: CONTINUOUS

RMRS LOGGING SUPERVISOR

APPROVAL Mark WoodDATE 7-7-99

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL MEASUREMENT	SAMPLE NUMBER	FLUCTUATE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	SOIL/ LITHOLOGIC LOG	SAMPLE DESCRIPTION
	Run #1	0.0-3.8								0.0-3.8' see log for BH90898
	Run #2	3.8-6.8	001 4.0 003 4.2 002 4.6		RS ISO VDA			3.8 4.0 5.0 6.0		3.6-6.8' Clayey Sand. wash ind 2.5 TR 5/2, 2.5 TR 4/2, pred very fine to fine, some med to coarse, subangular to subrounded, sand, no plasticity, trace to some silt. Some up to 3.5 cm broken and angular lithic gravel dry to damp
	Run #3	6.8-9.8	001 8.0 003 8.2 002 8.4 8.8		RS ISO VDA			6.8 7.0 8.0 9.0 9.8		6.8-9.8' Clayey Sand 6.8-8.4 grading to Sandy Clay @ 8.4-9.8 strong Brown 7.5 TR 5/6. Components P/A dry to damp

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Procedure No. RMRS OPS-PRO.101

Revision 0

Date effective: 12/31/98

Page 27 of 28

TAL  
7-7-99

## ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE BOREHOLE LOG

PAGE 2 OF 3

Borehole Number: BH 965 98  
 Location - North: 749147 East: 2085867  
 Date: 5-17-99 → 5-21-99  
 Geologist: J. LUTHERER  
 Drilling Equip.: GEOPROBE DUAL WALL

Surface Elevation: 5976 ft  
 Area: 903 PAD  
 Total Depth: 23.8  
 Company: TIERRA Project No.: GE600000  
 Sample Type: CONTINUOUS

RMRS LOGGING SUPERVISOR

APPROVAL Mark WordDATE 7-7-99

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE INTERVAL (FIELD MEASUREMENT)	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	SOIL/LITHOLOGIC LOG	SAMPLE DESCRIPTION
Run #4; 9.8-12.0	Recovery: 3.1'		99A1817-003-XXX				SC	10.0		9.8-12.8 Clayey Sand; light brown to dark brown 7.5 TR 6/3 to 7.5 TR 3/3
			001 11.2					11.0		
			003 11.4							
			002 11.6							
			002 12.0					20		
Run #5 12.0-15.0	Recovery: 4.0'		002 TAL 6-15-99				SC	12.0		12.0-12.8 Clayey Sand; with some gravel reddish yellow fine to coarse sand, fine to coarse, subrounded to subangular dense, moist-wet.
								13.0		
							CL	14.0		12.8-15.0 Sandy clay with trace fine gravel, fine to coarse sand, subrounded, slight plasticity, stiff to calcareous nodules moist. 12.8-13.5 light olive gray 2.5 TR 6/6
								15.0		13.5-15.0 mottled, dom. red 2.5 TR 5/6 to 16.0 olive gray 2.5 TR 6/2
Run #6 15.0-18.0	Recovery: 4.0'		002 15.2				CL	15.0		15.0-17.0 Sandy clay (CL) with some fine gravel fine to coarse sand
			003 15.6					16.0		subrounded to subangular stiff moist mottled light olive gray (2.5 TR 6/2) to yellowish red (5 TR 4/6)
			001 15.8							
			001 16.0							
Run #7 18.0-18.6	Rec: .2'		99A1817-004-XXX				SC	17.0		17.0-18.0 Clayey Sand; gravel H. gray 5/7
								18.0		fine to coarse sand, fine to coarse gravel with clay dense, moist
Run #8 18.6-21.1	Recovery: 1.3'						GW	18.0		Gravel: quartzite rubble - broken, angular to ~4 cm, wet.
										18.2-18.6 No Recovery
							GC	19.0		18.6-21.1 Gravelly Sand reddish yellow 7.5 TR 6/6, fine to coarse, subangular to subrounded, light, broken to subangular up to 4 cm lithic gravel, silty, locally

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Procedure No. RMRS/OPS-PRO.101

Revision 0

Date effective: 12/31/98

Page 27 of 28

## ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE BOREHOLE LOG

PAGE 3 OF 3

Borehole Number: BH96598  
 Location - North: 749147 East: 2085867  
 Date: 5-17-99 → 5-21-99  
 Geologist: L. LUTHERER  
 Drilling Equip.: GEOPROBE DUAL WALL

Surface Elevation: 5976 ft  
 Area: 903 PAD  
 Total Depth: 23.8  
 Company: TIERRA Project No.: 6E600000  
 Sample Type: CONTINUOUS

RMRS LOGGING SUPERVISOR

APPROVAL

Mark WardDATE 7-7-99

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL (FIELD MEASUREMENT)	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	SOIL LITHOLOGIC LOG	SAMPLE DESCRIPTION
	Run #8 18.6-21.1	RECOVERY: 1.3					GC	20.0		abundant low plastic clay, saturated to 18.8 - Lamp 18.8-19.9
								21.0		
	Run #9 21.1-22.5	UNABLE TO DETERMINE RECOVERY					GC	22.0		21.1-22.5 21.1-22.4 Gravelly Sand A/A wet. locally grading to clayey sand
			223 V04				SL			22.4-22.5 Claystone, BR contact @ 22.4
	Run #10 20.8-23.8	RECOVERY 3.3	002 22.4 003 ISO 22.9 001 RS 23.1				BR	23.0		22.5-23.8 Claystone 2.5YR 3/3 dark olive brown, DTR 7/11 light gray some DTR 6/8 brownish yellow - oxidized weathered, locally dense + waxy, poorly indurated mod. friable, w/very fine (gray) sand, silt locally grading to silty claystone
			9946817.005 XY					23.8		TD = 23.8
	* Hole collapsed to 20.5 Event 005 sampled in interval 20.8-23.8									

NOTES: General: USCS is modified for this log as follows:

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(1) Badly broken core, accurate footage measurements not possible.

(2) Core breaks cannot be matched, accurate footage measurements not possible.

Procedure No. RMRS/OPS-PRO.101

Revision 0

Date effective: 12/31/98

Page 27 of 28

## ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE BOREHOLE LOG

PAGE 1 OF 3Borehole Number: BH 96698Surface Elevation: 5977 ftLocation - North: 749128 East: 2085846Area: 903 PADDate: 5-12-99 to 5-13-99 + 6/8/99Total Depth: 23.1 ftGeologist: T. LUTHERERCompany: TERRAProject No. GE600000Drilling Equip.: GEO PROBE DUAL WALLSample Type: CONTINUOUS

RMRS LOGGING SUPERVISOR

APPROVAL Mark WoodDATE 2-7-99

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL (FIELD MEASUREMENT)	SAMPLE NUMBER	FLUORINE ANALYSIS	BLINDING ANALYSIS	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	SOIL LITHOLOGICAL TIME	SAMPLE DESCRIPTION
	Run #1, 0.0 - 3.8	Recovery: 2.9'						1.0		0.0 - 3.8 See Borehole log of BH 90898
								2.0		
								3.0		
								3.8		2.9 - 3.8; No Recovery
								3.8		
								4.0		
	Run #2 3.8 - 6.8	Recovery: 3.9'	001 4.0 003 4.2 002 4.6	RS ISO VOA			SL	4.0		3.8 - 6.8' Clayey Sand, Strong brown to light brown 7.5 to 5/6 to 7.5 to 6/3 prod. very fine, some medium to coarse, angular to subrounded, lithic sand, low plastic clay, silty, with some up to 3mm angular to broken lithic gravel, damp
								5.0		
								6.0		
			99A6649 001, xxx					6.8		6.8 - 9.8' Clayey Sand, with gravel A/A
								7.0		
								8.0		
	Run #3 6.8 - 9.8	Recovery: 3.7'	001 7.8 003 8.0 002 8.2 002 8.6	RS ISO VOA			SL	8.0		
								9.0		
			99A6649 002 xxx							

NOTES. General: USCS is modified for this log as follows:

Materials amounts are estimated by % volume instead of % weight.

(1) Badly broken core, accurate footage measurements not possible.

(2) Core breaks cannot be matched, accurate footage measurements not possible.

Procedure No. RMRS/OPS-PRO.101

Revision 0

Date effective: 12/31/98

Page 27 of 28

## ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE BOREHOLE LOG

PAGE 2 OF 3

Borehole Number: BH96698  
 Location - North: 749128 East: 2085846  
 Date: 5-12-99 → 5-13-99 AND 6-8-99 → 6-9-99  
 Geologist: T. LUTHERER  
 Drilling Equip.: GEOPROBE DUAL WALL

Surface Elevation: 5977 FT  
 Area: 903 PAD  
 Total Depth: 23.1 FT  
 Company: TIERRA Project No.: 6E600000  
 Sample Type: CONTINUOUS

RMRS LOGGING SUPERVISOR

APPROVAL

Mark WordDATE 7-7-99

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL MEASUREMENT	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	SOIL LITHOLOGIC LOG	SAMPLE DESCRIPTION
	Run 4.9.8-12.8'	Recovery 2.4'	99A6649 003 x2x				CL	10.0		9.8-12.8
								11.0		9.8-10.4 Gravelly sand; very pale brown
								12.0		10YR 8/4, primarily very fine to fine, some
								12.2		medium to coarse, subangular to subround.
								12.8		lithic sand, fine to coarse, subangular
								13.0		lithic gravel, sandy, trace to some clay. moist
								14.0		10.4-12.2 sandy clay grading to clay w/
								15.0		some sand + gravel, very pale brown to weak red
								15.8		10YR 7/3 to 10YR 4/2 moist, 12.0-12.2 saturated *
	Run 5.12.8-15.8'	Recovery 2.9'					CL	16.0		12.8-15.8 clay with perched water to 10.7'
								17.0		12.8-14.2 clay, with some sand,
								18.0		A/A moist.
								19.0		14.2-15.7 sandy clay A/A moist.
								20.0		locally grading to clayey sand
								21.0		15.7-15.8; no recovery
								22.0		Borehole abandoned 5/13/99
	Run 15.8-17.3'	Recovery 1.1'					SC	23.0		15.8-17.3'
								24.0		clay; reddish yellow to very pale brown
								25.0		7.5YR 7/6 to 10YR, slight plasticity, trace
								26.0		to some prod. fine to coarse sand, traces to
								27.0		some broken to subangular, up to 4cm lithic
								28.0		gravel, moist
	Run 17.3-18.3	Recovery 1.6'	99A730 001 xxx				SC	29.0		17.3-18.3 clayey sand: strong brown to
								30.0		very pale brown. 7.5YR 5/8 to 10YR 7/3
								31.0		fine to coarse, subangular, lithic sand, low
								32.0		to non-plastic clay, gravel A/A wet.
	Run 18.3-19.8	Recovery 1.5'					SC	33.0		18.3-19.8 clayey sand: A/A wet
								34.0		18.3-18.9

NOTES: General: USCS is modified for this log as follows:

Materials amounts are estimated by % volume instead of % weight.

(1) Badly broken core, accurate footage measurements not possible.

(2) Core breaks cannot be matched, accurate footage measurements not possible.

Procedure No. RMRS/OPS-PRO.101

Revision 0

Date effective: 12/31/98

Page 27 of 28

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and 2/4 apparently

## ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE BOREHOLE LOG

PAGE 3 OF 3

Borehole Number: BH96698  
 Location - North: 749128 East: 2085846  
 Date: 5-12-99 → 5-13-99  
 Geologist: T. LUTHERER  
 Drilling Equip.: GEO PROBE Dual Wall

Surface Elevation: 5977 ft  
 Area: 903 PAD  
 Total Depth: 23.1  
 Company: TIERRA Project No. GE600000  
 Sample Type: CONTINUOUS

RMRS LOGGING SUPERVISOR

APPROVAL

Mark WoodDATE 7-7-99

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL (FIELD MEASUREMENT)	SAMPLE NUMBER	FRAC/THIN ANGLE	BL/DRY ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH FEET	SIZE/ LITHOLOG TEXT	SAMPLE DESCRIPTION
	<u>Run# 9</u>	<u>19.8-20.6</u>	<u>003</u>		<u>1AL</u>	<u>2</u>	<u>SC</u>	<u>20.0</u>	<u>6/8</u>	<u>19.8-20.6 Clayey Sand A/A</u>
	<u>Run# 10</u>	<u>20.6-21.6</u>	<u>002</u>					<u>21.0</u>	<u>6/8</u>	<u>20.6-21.6 Clayey Sand A/A moist</u>
	<u>Run# 11</u>	<u>21.6-23.1</u>	<u>001</u>				<u>SC</u>	<u>22.0</u>	<u>6/8</u>	<u>21.6-22.45 Clayey Sand A/A moist</u>
			<u>002</u>					<u>22.45</u>	<u>6/8</u>	<u>22.45-23.1 Silty Claystone very pale</u>
			<u>003</u>					<u>23.0</u>	<u>6/8</u>	<u>brown 10% R 7/3, dense, locally waxy,</u>
								<u>23.1</u>	<u>6/8</u>	<u>mod friable, mod impure, grading to</u>
								<u>23.5</u>	<u>6/8</u>	<u>Claystone w/ silty sand</u>
										<u>Top of Bedrock = 22.45</u>
										<u>TD = 23.1</u>

NOTES: General: USCS is modified for this log as follows:

Materials amounts are estimated by % volume instead of % weight.

(1) Badly broken core, accurate footage measurements not possible.

(2) Core breaks cannot be matched, accurate footage measurements not possible.

Procedure No. RMRS OPS-PRO.101

Revision 0

Date effective: 12/31/98

Page 27 of 28

## ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE BOREHOLE LOG

PAGE 1 OF 3

Borehole Number: BH96798Surface Elevation: 5977 ftLocation - North: 749108 East: 2085866Area: 903 PADDate: 4/28/99 → 5/12/99Total Depth: 20.8 ftGeologist: T. LUTHERERCompany: TIERRAProject No.: GE600000Drilling Equip.: GEOPROBE DUAL WALLSample Type: CONTINUOUS

RMRS LOGGING SUPERVISOR

APPROVAL Mark WoodDATE 7-6-99

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL (MEASURED)	SAMPLE NUMBER	FUNCTIONAL ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	SOIL/ LITHOLOGICAL TEXT	SAMPLE DESCRIPTION
	Run # 1 0.0-3.8	RECOVERY: 38'						1.0		0.0-3.3 See borehole log for BH90898 or BH91398
								2.0		
								3.0		
								3.8		3.3-3.8; No Recovery
	Run # 2 3.8-6.8	RECOVERY: 3.3'	TALS-25-99					4.0		
			001 4.0 RS					4.2		3.8-6.8 Clayey Sand; Yellowish to pale yellow, 5 YR 5/6 to 2.5 Y 5/4, some light red 10R 6/6 near top of interval.
			002 4.4 ISO					4.4		fine to coarse, angular to subangular lithic sand, non to low plastic clay.
			002 4.8 VOA					4.8		Some to abundant, fine to coarse, subrounded to broken, lithic gravel.
			99A6650-001-xxx				SC	5.0		damp.
								6.0		
								7.0		
	Run # 3 6.8-9.8	RECOVERY: 3.4'						8.0		6.8-9.8 Sandier clay; light gray to yellowish brown, 10YR 7/1 to 10YR 5/6, primarily very fine to fine, some medium to coarse subangular to subrounded lithic + quartz sand, with traces up to 4cm broken, total angular lithic gravel, non to low plastic clay dry to damp.
			001 8.2 RS					8.2		
			002 8.4 ISO					8.4		
			002 8.8 VOA					8.8		
			99A6650-002-xxx				CL	9.0		
								9.8		

NOTES: General: USCS is modified for this log as follows:

Materials amounts are estimated by % volume instead of % weight.

(1) Badly broken core, accurate footage measurements not possible.

(2) Core breaks cannot be matched, accurate footage measurements not possible.

Procedure No. RMRS/OPS-PRO.101

Revision 0

Date effective: 12/31/98

Page 27 of 28

## ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE BOREHOLE LOG

PAGE 2 OF 3

Borehole Number: BH96798Surface Elevation: 5977 ftLocation - North: 749108 East: 2085866Area: 903 PADDate: 4-28-99 → 5-12-99Total Depth: 20.8 ftGeologist: T. LUTHERERCompany: TERRAProject No.: 6E600000Drilling Equip.: GEOPROBE DUAL WALLSample Type: CONTINUOUS

RMRS LOGGING SUPERVISOR

APPROVAL Mark WoodDATE 7-6-99

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL (FIELD MEASUREMENT)	SAMPLE NUMBER	FRACATURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	SOIL LITHOLOGIC LOG	SAMPLE DESCRIPTION
	Run # 4.98-11.8	RECOVERY: 2.9'						10.0		9.8-11.8 Sandy Clay with some gravel A/A - damp - dry
	Run # 5.118-13.8	RECOVERY: 3.1'	001 RS 12.0 002 ISO 12.2 002 VOA 12.5				CL	11.0		
								11.8		
								12.0		11.8-13.8 Sandy Clay with some gravel locally grading to clayey sand dry - damp A/A
								12.2		
								12.5		
								13.0		
								13.8		
	Run # 6.13.8-15.8	RECOVERY: 2.1'					CL	14.0		13.8-15.8 Sandy Clay with some gravel dry - damp
								15.0		
								16.0		
	Run # 17.15.8-18.8	RECOVERY: 3.95'	002 16.0 VOA 001 16.4 RS 003 16.6 RS 003 16.8 ISO				CL	17.0		TAL 6-22-99 15.8-18.8 17.5 Clay, locally grading to gravelly clay, light gray 2.5 < 7/2 low to no plasticity, trace to some silt, trace to some fine to coarse sand, angular to subangular with up to 4cm angular to subangular also broken lithic gravel dry - damp
								17.5		
								18.0		17.5-18.8 clayey sand, olive yellow to light gray 2.5 < 5/16 to 2.5 < 1/4 A/A dry
	Run # 18.8-19.8	RECOVERY: 1.0'					SC	19.0		18.8-19.8 clayey sand A/P with some gravel, damp
								19.8		
			001 20.0 RS					20.0		

NOTES: General: USCS is modified for this log as follows:

Materials amounts are estimated by % volume instead of % weight.

(1) Badly broken core, accurate footage measurements not possible.

(2) Core breaks cannot be matched, accurate footage measurements not possible.

Procedure No. RMRS/OPS-PRO.101

Revision 0

Date effective: 12/31/98

Page 27 of 28



# ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE BOREHOLE LOG

PAGE 3 OF 3

Borehole Number: BH96798  
Location - North: 749108 East: 2085646  
Date: 4-28-99 → 5-12-99  
Geologist: J. LUTHERER  
Drilling Equip.: GEOPROBE

Surface Elevation: 5977 Ft  
Area: 903 PAD  
Total Depth: 20.8 ft  
Company: TIERRA Project No GE 6000  
Sample Type: \_\_\_\_\_

RMRS LOGGING SUPERVISOR

APPROVAL Mark Wood

DATE 7-6-99

TOP BOTTOM OF CORE IN BOX	TOP BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL (FIELD MEASUREMENT)	SAMPLE NUMBER	PICTURE ANGLE	BEADING ANGLE	GRAIN SIZE DISTRIBUTION	USCS STATION	DEPTH IN FEET	SOIL/ LITHOLOGIC LOG	SAMPLE DESCRIPTION
Rm 19	19.8-20.8	Recovery: 1.5'	003 003 002 003	20.0 20.4 20.4 20.8	ISO RUP		SC	20.0 20.8		19.8-20.8, Clayey sand with gravel, comp.
			99A 6650 ISO RUP VDA RUP VDA RINSE " " " " ISO RINSE RS RINSE	005-xxx 006-003 006-002 007-002 007 003 007 004 007 005 007 001					TD=20.8, Geoprobe drilling, Refusal at 20.8 Ft	

NOTES: General: USCS is modified for this log as follows:

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(1) Badly broken core, accurate footage measurements not possible.

(2) Core breaks cannot be matched, accurate footage measurements not possible.

Procedure No. RMRS/OPS-PRO.101

Revision 0

Date effective: 12/31/98

Page 27 of 28

## ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE BOREHOLE LOG

PAGE 1 OF 2

Borehole Number: BH 96898Surface Elevation: 5978 ftLocation - North: 749095 East: 2085713Area: 903 PADDate: 4-12-99 → 4-13-99Total Depth: 18.8 ftGeologist: T. LUTHERERCompany: TIERRAProject No. GE600000Drilling Equip.: GEO PROBE DUAL WALLSample Type: CONTINUOUS

RMRS LOGGING SUPERVISOR

APPROVAL Mark WardDATE 7-6-99

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL FIELD MEASUREMENT	SAMPLE NUMBER	FRACTURE ANGLE	BLINDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	SONO/ LITHOLOG (cm)	SAMPLE DESCRIPTION
	Run #1, 0.0-3.8'	Recovery: 2.4'						1.0		0.0-2.4 See Borehole log for BH 91198
	Run #2, 3.8-6.8'	Recovery: 3.8'	001 RS 002 ISO 003 003 VOA 002			TAL 4/2/99	SC	2.4		2.4 to 3.8; No Recovery,
	Run #3, 6.8-9.8'	Recovery: 3.5'	001 RS 002 ISO 003 003 VOA 002			TAL 4/2/99	SC	3.8		3.8-6.8 Sandy Clay/Clayey Sand; pink to reddish yellow, 5TR 7/4 to 5TR 7/6. fine to coarse subangular Sand moderately plastic clay, some up to 4cm angular to subangular lentic gravel, damp.
								4.0		
								4.2		
								4.4		
								4.7		
								5.0		
								6.0		
								6.8		
								7.0		
								8.0		
								8.2		
								8.4		
								8.7		
								9.0		
								9.8		

NOTES: General: USCS is modified for this log as follows:

Materials amounts are estimated by % volume instead of % weight.

(1) Badly broken core, accurate footage measurements not possible.

(2) Core breaks cannot be matched, accurate footage measurements not possible.

Procedure No. RMRS/OPS-PRO.101

Revision 0

Date effective: 12/31/98

Page 27 of 28

## ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE BOREHOLE LOG

PAGE 2 OF 2Borehole Number: RAH96898Surface Elevation: 5978 FTLocation - North: 749095 East: 2085713Area: 903 PADDate: 4-12-99 → 4/13/99Total Depth: 18.8 FTGeologist: J. LUTHERERCompany: TERRAProject No.: 6E600000Drilling Equip.: GEOPROBE DUAL WALLSample Type: CONTINUOUS

RMRS LOGGING SUPERVISOR

APPROVAL

Mark WardDATE 7-6-99

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL (FIELD MEASUREMENT)	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	SOIL/ LITHOLOGIC LOG	SAMPLE DESCRIPTION
	Run # 4 9.8-12.8	Recovery 3.6'	99A6307-003	XXY			SC	10.0		9.8-12.8 clayey Sand same as above
			001 RS					11.0		
			002 ISO 003					11.9		
			003 VOA 002					12.0		
								12.1		
								12.8		
	Run # 5 12.8-15.8	Recovery 2.0'					SC	13.0		12.8-15.8 clayey Sand same as above
								14.0		
								15.0		
								15.8		
	Run # 6 15.8-18.8	Recovery 4.0'	001 RS				SC	16.0		15.8 to 17.3 clayey Sand same as above
			002 ISO 003					17.0		
			003 VOA 002					17.3		
								18.0		
								18.8		
								19.0		
										TD = 18.8 Slightly weathered (R.R.) Top of Bedrock = 17.3 FT

NOTES: General: USCS is modified for this log as follows:

Materials amounts are estimated by % volume instead of % weight.

(1) Badly broken core, accurate footage measurements not possible.

(2) Core breaks cannot be matched, accurate footage measurements not possible.

Procedure No. RMRS/OPS-PRO.101

Revision 0

Date effective: 12/31/98

Page 27 of 28

## ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE BOREHOLE LOG

PAGE 1 OF 2Borehole Number: BH96998Surface Elevation: 5978 ftLocation - North: 749038 East: 2085711Area: 903 PADDate: 4-20-99 → 4-28-99Total Depth: 18.8 ftGeologist: T. LUTHERERCompany: TIERRAProject No. GE600000Drilling Equip.: GEO PROBE DUAL WALLSample Type: CONTINUOUS

RMRS LOGGING SUPERVISOR

APPROVAL

Mark Wood

DATE

7-6-99

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL (FIELD MEASUREMENT)	SAMPLE NUMBER	FRAC TURE ANGLE	CLUSTER ANGLE	CLUSTER DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	SOIL LITHOLOGIC LOG	SAMPLE DESCRIPTION
										0.0-2.65
										See Borehole log for BH 91198
								1.0		
								2.0		
								3.0		2.65 to 3.8 No Recovery
								3.8		
								4.0		
			001 4.2 RS							3.8-6.8 Sandy Clay; very pale brown to yellowish red very fine to fine, locally medium to coarse, angular to subangular PL 5-25-99, low to medium plasticity Silty with some up to 3.5 angular to subangular lithic gravel. damp locally grading to clayey sand
			003 4.4 ISO				SC			
			002 4.8 VOA					5.0		
								6.0		
							SC			
								6.8		
								7.0		
										9.8-9.8 Sandy Clay A/A locally grading to clayey sand, dry
								3.0		
			001 8.2							
			003 8.4				SC			
			002 8.8					9.0		
										9.5-9.8 No Recovery

NOTES: General: USCS is modified for this log as follows:

Materials amounts are estimated by % volume instead of % weight.

(1) Badly broken core, accurate footage measurements not possible.

(2) Core breaks cannot be matched, accurate footage measurements not possible.

Procedure No. RMRS/OPS-PRO.101

Revision 0

Date effective: 12/31/98

Page 27 of 28

## ROCKY FLATS PLANT BOREHOLE LOG

PAGE 2 OF 2

Borehole Number: BH96998  
 Location - North: 749038 East: 2085711  
 Date: 4-20-99 → 4-28-99  
 Geologist: T. LUTHERER  
 Drilling Equip.: GEOPROBE DUAL WALL

Surface Elevation: 5978 ft  
 Area: 903 PAD  
 Total Depth: 18.8 ft  
 Company: TIERRA Project No.: 6E000000  
 Sample Type: CONTINUOUS

EG&amp;G LOGGING SUPERVISOR

APPROVAL

Mark Wood

DATE

7-6-99

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL (FIELD MEASUREMENT)	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	SOIL/ LITHOLOGIC LOG	SAMPLE DESCRIPTION
	Run # 4: 9.8 - 12.8	Recovery: 4.0	99A6824-003-XXX	20 12.2 12.4 12.7	RS ISO VOA		SC	10.0 11.0 12.0 12.8 13.0 14.0 15.0 15.8 16.0		9.8-12.8 Sandy Clay; A/A locally clay with some sand. dry
	Run # 5: 12.8 - 15.8	Recovery: 3.2					SC	17.0 17.4 17.8 18.0		12.8-15.8 Sandy Clay; A/A locally grading to clay with some sand A/A. dry
	Run # 6: 15.8 - 17.8	Recovery: 3.2	99A6824-004-XXX	17.4 17.5 17.6 17.7			SC	17.8 18.0 18.2 18.4 18.6 18.8 19.0		15.8-17.4 Sandy Clay; A/A locally grading to clay with some sand A/A dry → damp 17.4-17.8 Gravelly Sand; very pale brown red fine to very fine, some med. to coarse angular, slightly rough up to 4mm angular + broken lithic gravel with 17.8-18.8 Claystone; oxidized (weathered) to 18.2. light gray to brownish yellow; 7.5% np-pfr 66, massive, stiff, trace to some silt. very friable, with twinned, 45° scallop, nonoxidized, non stickensided, damp.
	Run # 7: 17.8 - 18.8	Recovery: 1.1		45°			BR.			TO = 18.8 Bedrock = 17.8 ft Top of

NOTES: General: USCS is modified for this log as follows:

Materials amounts are estimated by % volume instead of % weight.

(1) Badly broken core, accurate footage measurements not possible.

(2) Core breaks cannot be matched, accurate footage measurements not possible.

## ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE BOREHOLE LOG

PAGE 1 OF 2Borehole Number: BH97098Surface Elevation: 5979 ftLocation - North: 748980 East: 2085611Area: 903 PADDate: 3-29-99 → 4-7-99Total Depth: 18.8Geologist: T. LUTHERERCompany: TIERRAProject No. GE600000Drilling Equip.: GEO PROBE DUAL WALLSample Type: CONTINUOUS

RMRS LOGGING SUPERVISOR

APPROVAL

Mark Wood

DATE

7-7-99

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL (FIELD MEASUREMENT)	SAMPLE NUMBER	FUNCTION ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	SOIL/ LITHOLOGIC TEXT	SAMPLE DESCRIPTION
	Run# 1: 0.0'-3.8'	Recovery: 2.7'						0.0		0.0-3.8 See Borehole Log of BH 91598
								1.0		
								2.0		
								2.7		
								3.0		2.7-3.8: No Recovery
								3.8		
	Run# 2: 3.8'-6.8'	Recovery: 2.35'	40001 RS 40002 ISO 40003 VOA 4.7				SC	4.0		3.8-6.8: Sandy Clay, light brown, 6YR 6/4 very fine to medium subangular sand locally coarse, trace to some up to 4cm angular and broken siltitic sand. heavily silty, no plasticity, dry
								5.0		
								6.0		
								6.15		6.15'-6.8: No Recovery
								6.8		
	Run# 3: 6.8'-9.8'	Recovery: 2.9'	99A6308-001-XX 8.0 8.2 RS 8.4 ISO 8.8 VOA				SC	7.0		6.8-9.8 Sandy Clay, locally grading to clayey sand. Red to 6YR 6/8 reddish yellow. Red: 5YR 5/8 A/A dry
								8.0		
								9.0		
								9.7		
								9.8		9.7-9.8: No Recovery
								10.0		

NOTES: General: USCS is modified for this log as follows:

Materials amounts are estimated by % volume instead of % weight.

(1) Badly broken core, accurate footage measurements not possible.

(2) Core breaks cannot be matched, accurate footage measurements not possible.

Procedure No. RMRS/OPS-PRO.101

Revision 0

Date effective: 12/31/98

Page 27 of 28

## ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE BOREHOLE LOG

PAGE 2 OF 2

Borehole Number: BH97098  
 Location - North: 748986 East: 2085611  
 Date: 3-29-99 → 4-7-99  
 Geologist: J. LUTHERER  
 Drilling Equip.: GEOPROBE DUAL WALL

Surface Elevation: 5979 ft  
 Area: 903 PAD  
 Total Depth: 18.8  
 Company: TIERRA Project No.: 6E600000  
 Sample Type: CONTINUOUS

RMRS LOGGING SUPERVISOR

APPROVAL

Mark WoodDATE 7-7-99

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL (FIELD MEASUREMENT)	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	SOIL/ LITHOLOGIC LOG	SAMPLE DESCRIPTION
	Run # 4: 9.8-12.8	Recovery: 3.9'	99A6708-008-xxx				CL	10.0		9.8-11.1 Clay more to low plasticity, trace to sand sand A/A, trace silt, trace gravel A/A; dense, mag size, dry → damp.
			001 12.0				ms	11.0		
			002 12.2 RS				CL	11.1		
			003 12.4 ISO				CL	12.0		
			003 12.6 VOA				CL	12.8		
	Run # 5: 12.8-15.8	Recovery: 3.5'					CL	13.0		12.8-15.8 Sandy clay A/A locally grading to clayey sand. damp A/A
			TAL 4/8/99				CL	14.0		
			004 16.0				CL	15.0		
			007 16.2 RS				CL	15.8		
			002 16.5 ISO				CL	16.0		15.8-16.8 Sandy clay A/A locally grading to clayey sand damp A/A
			003 17.0				CL	17.0		16.8 to 18.8 Broken clayey sandstone light gray silt, some reddish gray, 7.5-8.5 very poorly indurated, slightly weathered, predominantly very fine to fine subrounded to rounded, quartzose, low to medium plastic clay, damp.
	Run # 6: 15.8-18.8	Recovery: 3.7'	99A6308-004-xxx				CL	18.0		
							CL	19.0		
							CL	19.0		TD = 18.8 ft

NOTES: General: USCS is modified for this log as follows:

Materials amounts are estimated by % volume instead of % weight.

(1) Badly broken core, accurate footage measurements not possible.

(2) Core breaks cannot be matched, accurate footage measurements not possible.

Procedure No. RMRS/OPS-PRO.101

Revision 0

Date effective: 12/31/98

Page 27 of 28

## ROCKY FLATS PLANT BOREHOLE LOG

PAGE 1 OF 3

Borehole Number: BH 977198  
 Location - North: 248911 East: 2085611  
 Date: 12-14-98 → 1-7-99  
 Geologist: T. LUTHERER  
 Drilling Equip.: GEO PROBE DUAL WALL

Surface Elevation: 5980 FT  
 Area: 903 PAD  
 Total Depth: 26.5 ft.  
 Company: TIERRA Project No.: 6E600000  
 Sample Type: CONTINUOUS

EG&amp;G LOGGING SUPERVISOR

APPROVAL

Mark WoodDATE 7-7-99

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL (FIELD MEASUREMENT)	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	SOIL LITHOLOGIC LOG	SAMPLE DESCRIPTION
	Run # 1, 0.0-3.8'	Recovery: 2.3'						1.0		0.0-3.8 See Borehole log for BH 92098
								2.0		
								3.0		2.3-3.8 No Recovery
								3.8		
	* Run # 2, 3.8-6.5'	Recovery: 2.8'	004 RS 005 ISO 006 VOA				SC	4.0		3.8-6.5 Clayey Sand; Yellowish red to yellow STR 5/6 to 2.5 7/4, fine to coarse, angular to subangular, little sand, angular to subangular, little gravel fine to coarse, more to low plastic clay, damp
								4.2		
								4.4		
								4.8		
								5.0		
			99A4102.002 xxx					6.0		
								7.0		6.5-9.0 Clay w/ some sand, grading to clayey Sand. damp clay: non to low plasticity, fine. 7.0-7.5 possible graphite/carbon black, soft, powdery
								8.0		
								9.0		
	* Run # 3, 6.5-9.0'	Recovery: 3.4'	001 RS 6.8 002 ISO 7.0 003 VOA 7.3 7.6				SC			9.0-11.5 clayey Sand: damp
			99A4102.002 xxy							
	* Run # 4, 9.0-11.5'	Recovery: 3.2'					SC			

NOTES: General: USCS is modified for this log as follows:

Materials amounts are estimated by % volume instead of % weight.

(1) Badly broken core, accurate footage measurements not possible.

(2) Core breaks cannot be matched, accurate footage measurements not possible.

\* OFFSET STARTED ON 12-15-98.  
 ORIGINAL BOREHOLE ENCLOSED  
 REFUSAL AT 12.0' BGS



## ROCKY FLATS PLANT BOREHOLE LOG

PAGE 2 OF 3

Borehole Number: BH97198  
 Location - North: 748911 East: 2085611  
 Date: 12-14-98 → 1-7-99  
 Geologist: T. LUTHERER  
 Drilling Equip.: GEO PROBE DUAL WALL

Surface Elevation: 5980 ft  
 Area: 903 PAD  
 Total Depth: 26.5 ft  
 Company: TIERRA Project No.: 6E600000  
 Sample Type: CONTINUOUS

EG&amp;G LOGGING SUPERVISOR

APPROVAL

Mark Ward

DATE

7-7-99

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL (FIELD MEASUREMENT)	SAMPLE NUMBER	FRACTURE ANGLE	BEARING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	SOIL/ LITHOLOGIC LOG	SAMPLE DESCRIPTION
* Run # 4	90-11.5	Rec: 3.2'					SC	10.0		9.0-11.5 Clayey Sand; damp
* Run # 5	11.5-14.0	Rec: 3.8'	7-7-99 006 007 008 009 9944102 002 XXX	RS ISO VOK	007 008 009		6AA	11.0 12.0 12.2 12.4 12.8 13.0		11.5-14.0 11.5-12.0 Sandy Gravel. Sand A/A, very silty, Gravel A/A. dry Gravel: Quartzose 12.0-14.0 Clayey Sand; Brown 7.5TR 6/8 damp
* Run # 6	14.0-16.5	Recovery 3.0	TAL 7-7-99 009 010 011 012	RS ISO VOK	010 011 012		SC	14.0 15.0 15.3 15.4		14.0-16.5 Clayey Sand; A/A grading to Clay w/ Sand towards bottom of interval.
* Run # 7	16.5-19.0	Recovery 3.7					CL	16.0 16.1		15.6-16.5 Clay; pinkish gray to reddish yellow 7.5TR 6/2 to 7.5TR 6/6, dense, slightly plastic. trace sand, trace gravel.
* Run # 8	19.0-21.5	RECOVERY 2.5					CL	17.0		16.5-17.8 Clay, with sand; A/A damp
							SC	18.0		17.8-19.0 Clayey Sand; A/A damp
							SC	19.0		19.0-21.5 Clayey Sand A/A damp

NOTES: General: USCS is modified for this log as follows:

Materials amounts are estimated by % volume instead of % weight.

(1) Badly broken core, accurate footage measurements not possible.

(2) Core breaks cannot be matched, accurate footage measurements not possible.

## ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE BOREHOLE LOG

PAGE 3 OF 3

Borehole Number: BH97198  
 Location - North: 248911 East: 2085411  
 Date: 12-14-99 → 1-7-99  
 Geologist: L. LUTHERER  
 Drilling Equip.: GEOPROBE

Surface Elevation: 5980 ft  
 Area: 903 PAD  
 Total Depth: 26.5 ft  
 Company: TIERRA Project No.: GE600000  
 Sample Type: Continuous

RMRS LOGGING SUPERVISOR

APPROVAL

Mark Ward

DATE

7-7-99

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL (FIELD MEASUREMENT)	SAMPLE NUMBER	FLUORINE ANALYSIS	HEAVY ANALYSIS	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	SOL/ LITHOLOGIC LOG	SAMPLE DESCRIPTION
	Run #8 19.0-21.5	RECOVERY 2.5'	013 013 014 TAL 7-7-99	BS 013 ISO 014 VQA 015			20.2 20.4 20.8 SL	20.0 21.0		Clayey Sand A/A damp
	Run #9 21.5-24.0	RECOVERY 2.2'					SL	22.0 24.0		Clayey Sand A/A moist
	Run #10 24.0-26.5	RECOVERY 4.0'	015 TAL 7-7-99	BS 016 ISO 017 VQA 018			24.2 24.4 24.8	25.0 26.0		24.0-26.5 Sandstone: white to light gray also very pale brown to dark yellow brown. 2.5x N81, 2.5x N81 10xR 7/3 to 10xR 4/6, locally very silty, very fine to fine, subrounded, primarily qtz, locally very clayey, locally grading to silty claystone w/sand, friable, poorly indurated, oxidized, locally dense damp Bedrock at 24.0 ft TD = 26.5 ft

NOTES: General: USCS is modified for this log as follows:

Materials amounts are estimated by % volume instead of % weight.

(1) Badly broken core, accurate footage measurements not possible.

(2) Core breaks cannot be matched, accurate footage measurements not possible.

Procedure No. RMRS-OPS-PRO.101

Revision 0

Date effective: 12/31/98

Page 27 of 28

## ROCKY FLATS PLANT BOREHOLE LOG

PAGE 1 OF 2

Borehole Number: BH97298  
 Location - North: 748844 East: 2085930  
 Date: 5-26-99 → 6-2-99  
 Geologist: T. LUTHERER  
 Drilling Equip.: GEOPROBE DUAL WALL

Surface Elevation: 5974 FT  
 Area: 903 PAD Lip Area  
 Total Depth: 18.5 FT  
 Company: TIERRA Project No.: 6E00000  
 Sample Type: CONTINUOUS

EG&amp;G LOGGING SUPERVISOR

APPROVAL

Mark WoodDATE 7-6-99

TOP/BOTTOM UP CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL (FIELD MEASUREMENT)	SAMPLE NUMBER	FLUORE ANAL	BOILING ANAL	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	SOIL/ LITHOLOGIC LOG	SAMPLE DESCRIPTION
	Run #1, 0.0-3.8	Recovery: 2.65'						0		0.0-2.65 Gravelly Sand; very dark gray 5TR 3/1 to .5, remaining interval is reddish brown to dark reddish brown, 5TR 4/3 to 5TR 2.5/2 Fine to coarse, subangular to subrounded, lithic, fine to 4.4 cm subrounded to broken lithic gravel, some silt & clay, damp.
	Run #2, 3.8-6.8	Recovery: 2.7	99A6825 001 xxx				SC	4		3.8-6.5 Gravelly Sand; reddish brown to dark reddish brown, A/A
	Run #3, 6.8-8.8	Recovery: 2.7	99A6825 002 xxx				SC	7		6.5-8.8 Clayey Sand, light red, 10TR 6/8 to reddish gray 10TR 6/11, with some light reddish brown 2.5/4 0/6, fine to coarse, subangular to subrounded, up to 4.4 cm angular to lithic gravel, low plasticity, some silt, damp
	Run #4, 8.8-11.0	Recovery: 2.2						9		8.8-11.0 Clayey Sand A/A

NOTES: General: USCS is modified for this log as follows:

Materials amounts are estimated by % volume instead of % weight.

(1) Badly broken core, accurate footage measurements not possible.

(2) Core breaks cannot be matched, accurate footage measurements not possible.

## ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE BOREHOLE LOG

PAGE 2 OF 2

Borehole Number: BH97298  
 Location - North: 748844 East: 2085930  
 Date: 5-26-99  
 Geologist: T. LUTHERER  
 Drilling Equip.: GEOPROBE DUAL WALL

Surface Elevation: 5974 ft  
 Area: 903 PAD Lip Area  
 Total Depth: 18.5 ft  
 Company: TIERRA Project No.: 6E600000  
 Sample Type: CONTINUOUS

RMRS LOGGING SUPERVISOR

APPROVAL Mark WoodDATE 7-6-99

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL MEASUREMENT	SAMPLE NUMBER	FRACTURE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	SOIL LOG	SAMPLE DESCRIPTION
	Run #4 10.0-11.0	Recovery: 2.2			NR		SC	10.0		
	Run #5 11.0-13.6	Recovery: 2.6						11.0		USED SOLID POINT TO BREAK THROUGH OBSTRUCTION 2 11.0 - 12.0 INTERVAL WAS NOT SAMPLED
	Run #6 12.0-13.6	Recovery: 2.1	RS 12.2 001 ISO 12.4 002 VOA 12.8 003				SC	12.0		11.4-13.6 Clayey Sand A/A
	Run #7 13.6-15.5	Recovery: 1.3	99A6825 003				SC	13.0		
	Run #8 15.5-17.0	Recovery: 1.2	RS 16.2 001 ISO 16.4 002 VOA 17.0 003				SC	13.6		13.6-15.5 Clayey Sand A/A, wet @ 13.8
	Run #9 16.0-17.0	Recovery: 1.1	99A6825 004				SC	14.0		15.5-16.0; Clayey Sand A/A, damp to wet
	Run #10 17.0-18.5	Recovery: 1.5	RS 17.3 002 ISO 17.9 003 RS 18.1 001				SC	15.0		16.0-17.0; Clayey Sand A/A, damp to wet
			99A6825 005				SC	16.0		17.0-17.8 Clayey Sand A/A, wet
								17.0		17.8-18.5 Silty claystone slightly weathered mostly light gray 2.5 x R/W, some brownish yellow 10" R 6/6, very poorly indurated locally dense, massive, stiff - damp Top of Bedrock = 17.8 ft TD = 18.5 ft

NOTES: General: USCS is modified for this log as follows:

Materials amounts are estimated by % volume instead of % weight.

(1) Badly broken core, accurate footage measurements not possible.

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Procedure No. RMRS/OPS-PRO.101

Revision 0

Date effective: 12/31/98

Page 27 of 28

# ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE BOREHOLE LOG

PAGE 1 CF 1

Borehole Number: BH97398  
Location - North: 748827 East: 2086090  
Date: 6-14-99  
Geologist: T. LUTHERER  
Drilling Equip: GF2 PROBE DUAL

Surface Elevation: 5956 Ft  
Area: 903 PAD Lip Area  
Total Depth: 4.0  
Company: TIERRA Project No. GE600000  
Sample Type: CONTINUOUS

RMRS LOGGING SUPERVISOR

APPROVAL Mark Wood

DATE 7-2-99

[illegible]

NOTES. General: USCS is modified for this log as follows:

Materials amounts are estimated by % volume instead of % weight.

(1) Badly broken core, accurate footage measurements not possible.

(2) Core breaks cannot be matched, accurate footage measurements not possible.

Procedure No. RMRS/OPS-PRO.101

Revision 0

Date effective: 12/31/98

Page 27 of 28

## ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE BOREHOLE LOG

PAGE 1 OF 1

Borehole Number: BH 97498Surface Elevation: 5947 Ft.Location - North: 248770 East: 2086182Area: 903 PAD Lip AreaDate: 6-14-99Total Depth: 4.0Geologist: T. LUTHERERCompany: TIERRAProject No.: GE600000Drilling Equip.: GEO PROBE DUAL WALLSample Type: CONTINUOUS

RMRS LOGGING SUPERVISOR

APPROVAL \_\_\_\_\_

DATE \_\_\_\_\_

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL FIELD MEASUREMENT	SAMPLE NUMBER	FIXING MATERIAL	BEARING MATERIAL	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH FEET	SOIL COLOR LENS	SAMPLE DESCRIPTION
Box 1 of 1, 0.0-1.8'	Run # 1, 0.0-4.0	Recovery: 1.8'	001	RS	NO		ML	.45		0.0-1.3 clayey silt; dark reddish brown 57R 4/3, dense, mod. plasticity, traces fine to coarse, angular to subangular lithic sand, traces fine to coarse, broken and angular, lithic gravel, with organic matter, wet to moist.
			002	RS	001		CL	.9		
			003	RS	001		SC	1.0		
			004	RS	001			1.35		
								1.8		1.3-1.8 clayey sand, reddish brown, 57R 5/3, compacts as above, damp.
								2.0		
								3.0		
								4.0		
										TD = 4.0
			99A 6156	RS	RI			5.0		
				001	001					
				002	001					
				003	001					
				004	001					
								6.0		
								7.0		
								8.0		
								9.0		

NOTES: General: USCS is modified for this log as follows:

Materials amounts are estimated by % volume instead of % weight.

(1) Badly broken core, accurate footage measurements not possible.

(2) Core breaks cannot be matched, accurate footage measurements not possible.

Procedure No. RMRS-OPS-PRO.101

Revision 0

Date effective: 12/31/98

Page 27 of 28

## ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE BOREHOLE LOG

PAGE 1 OF 1Borehole Number: BH97598Surface Elevation: 5954 FT.Location - North: 248845 East: 2086247Area: 903 PAD Lip AreaDate: 6-14-99Total Depth: 4.0Geologist: T. LUTHERERCompany: TIERRAProject No. GE600000Drilling Equip.: GEO PROBE DUAL WALLSample Type: CONTINUOUS

RMRS LOGGING SUPERVISOR

APPROVAL Mark WoodDATE 7-2-99

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL (FIELD MEASUREMENT)	SAMPLE NUMBER EVENT	FLUORESCENCE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	SOIL/ LITHOLOGIC LOG	SAMPLE DESCRIPTION
Box 10F1, 00-2.7'	Run #1, 0.0-4.0'	Recovery: 2.7'	001	RS ISO	001					0.0-2.7 Clayey Silt: reddish black 10R 2.5/1, dense, mod. plasticity, tacos fine to coarse, granular to sub- angular, lithic sand, tacos fine to coarse, broken and angular lithic gravel with organic matter damp to moist.
			002	RS ISO	002		ML	1.0		
			003	RS ISO	001		CL			
			004	RS ISO	002			2.0		
			005	ISO DUP.	001	DUPLICATE				
			006	RS ISO	002	REINSTATES				
								3.0		
								4.0		
								5.0		
								6.0		
								7.0		
99A79	37		001	RS 001	001	21		8.0		
			002	001	002			9.0		
			003	001	002					
			004	001	002					
			005	001	002					
			006	001	002					

NOTES: General: USCS is modified for this log as follows:

Materials amounts are estimated by % volume instead of % weight.

(1) Badly broken core, accurate footage measurements not possible.

(2) Core breaks cannot be matched, accurate footage measurements not possible.

Procedure No. RMRS/OPS-PRO.101

Revision 0

Date effective: 12/31/98

Page 27 of 28

## ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE BOREHOLE LOG

PAGE 1 OF 3

Borehole Number: BH97698  
 Location - North: 749135 East: 2085880  
 Date: 6-18-99 → 6-23-99  
 Geologist: T. LUTHERER  
 Drilling Equip.: GEOPROBE DUAL WALL

Surface Elevation: 5976 FT  
 Area: 903 PAD  
 Total Depth: 903 PAD 6-25-99 22.8  
 Company: TIERRA Project No: GE60000  
 Sample Type: CONTINUOUS

RMRS LOGGING SUPERVISOR

APPROVAL Mark WoodDATE 7-6-99

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL (FIELD MEASUREMENT)	SAMPLE NUMBER EVENT	FINAL TIME ANGLE	BUDGET ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	SOIL/ LITHOLOGIC TEXT	SAMPLE DESCRIPTION
	Run #1, 00-3.8'	Recovery: 2.5'						10		0.0-3.8 See Borehole log of BH 90998
	Run #2, 3.8-6.8	Recovery: 3.9'	TAL 8-29-99 001 4.0 RS 001 001 4.2 ISO 003 006 4.4 ISO 003 DUP 4.6 001 5.2 VOA 002 VOA 002 DUP 006 5.8 99A 8275 001 xx 006 xx				SC	3.8 4.0 5.0 6.0		3.8-6.8 Clayey Sand, yellowish brown, 10YR 5/4, very fine to coarse, angular to subangular lithic sand, non plastic clay, silty, locally abundant up to 3.5 cm, broken to subangular lithic gravel, dry-locally damp.
	Run #3 6.8-9.8	Recovery: 3.5'	BOTTLE NO. 001 RS 8.2 003 VOA 002 ISO 8.6 8.8 99A 827 002 xx				SC GC SC	7.0 8.0 9.0 10.0		6.8-9.0 Clayey Sand, dark yellowish brown to yellowish brown, 10YR 4/4 to 10YR 4/5. components A/A. damp. 9.0-9.2 Sandy Gravel, color and components as above. damp. 9.2-9.8 Clayey Sand A/A damp.

NOTES: General: USCS is modified for this log as follows:

Materials amounts are estimated by % volume instead of % weight.

(1) Badly broken core, accurate footage measurements not possible.

(2) Core breaks cannot be matched, accurate footage measurements not possible.

Procedure No. RMRS/OPS-PRO.101

Revision 0

Date effective: 12/31/98

Page 27 of 28



## ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE BOREHOLE LOG

PAGE 2 OF 3

Borehole Number: BH197698  
 Location - North: 749135 East: 2085880  
 Date: 6-18-99 → 6-23-99  
 Geologist: J. LUTHERER  
 Drilling Equip.: GEOPROBE DUAL WALL

Surface Elevation: 5976 ft  
 Area: 903 PAD  
 Total Depth: 22.8  
 Company: TIERRA Project No.: 6E600000  
 Sample Type: CONTINUOUS

RMRS LOGGING SUPERVISOR

APPROVAL

Mark WoodDATE 7-6-99

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL (FIELD MEASUREMENT)	SAMPLE NUMBER	FRAC/URE ANGLE	BEDDING ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	SOIL LITHOLOGIC LOG	SAMPLE DESCRIPTION
Run # 4	9.8 - 12.8	Recovery: 3.3	001 11.0 RS 002 11.2 VOA 003 11.6 VOA 004 11.8 ISO				SC	10.0 11.0		9.8-11.9 Sandy Clay, A/A w/ locally abundant gravel, at times locally grading to Sandy Gravel A/A damp
Run # 5	12.8 - 14.8	Recovery: 3.3	001 13.2 RS 002 13.4 VOA 003 13.9 ISO 004 14.1				SC	12.0 13.0 14.0		11.9-12.8 Clayey Sand, Reddish Brown 5TR5p. loamy to mod plasticity, fine to medium, subangular to subrounded, lithic sand, damp to moist.
Run # 6	14.8 - 16.8	Recovery: 2.65	001 15.9 002 16.1 003 16.3 004 16.7				SC	15.0 16.0		12.8-14.8 Clayey Sand, pale yellow to olive yellow 2.5Y 7/4 to 2.5Y 6/8 fine to coarse sand, subangular to rounded lithic and calcic grains, trace prismatic lithic gravel, low plasticity, locally silty damp
Run # 7	16.8 - 18.8	Recovery: 3.25	001 17.8 002 18.0 003 18.2 004 18.8				SC	17.0 18.0		14.8-16.8 Clayey Sand, A/A, locally with abundant gravel, damp wet @
Run # 8	18.8 - 20.8	Recovery: 2.4	001 19.2 002 19.4 003 19.8				SC	19.0 20.0		16.8-18.8 Clayey Sand with some to abundant gravel A/A brownish yellow 10YR 6/6 to yellowish brown 10YR 5/6 and dark yellowish brown. damp
										18.8-20.8 Clayey Sand A/A

NOTES: General: USCS is modified for this log as follows:

Materials amounts are estimated by % volume instead of % weight.

(1) Badly broken core, accurate footage measurements not possible.

(2) Core breaks cannot be matched, accurate footage measurements not possible.

Procedure No. RMRS/OPS-PRO.101

Revision 0

Date effective: 12/31/98

Page 27 of 28

## ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE BOREHOLE LOG

PAGE 3 OF 3

Borehole Number: BH97698  
 Location - North: 749135 East: 2085880  
 Date: 6-18-99 → 6-23-99  
 Geologist: T. LUTHERER  
 Drilling Equip.: GEOPROBE DUAL WALL

Surface Elevation: 5976 ft.  
 Area: 903 PAD  
 Total Depth: 22.8  
 Company: TIERRA Project No. 6E600000  
 Sample Type: CONTINUOUS

RMRS LOGGING SUPERVISOR

APPROVAL Mark WoodDATE 7-6-99

TOP/BOTTOM OF CORE IN BOX	TOP/BOTTOM OF INTERVAL	FEET OF CORE IN INTERVAL (FIELD MEASUREMENT)	SAMPLE NUMBER	FINAL TIME ANGLE	DI. DI. DI. ANGLE	GRAIN SIZE DISTRIBUTION	USCS SYMBOL	DEPTH IN FEET	SOIL LITHOLOGICAL TEXT	SAMPLE DESCRIPTION
	Run # 8	Recovery: 2.4					SC	20.0		
	Run # 9	Recovery: 1.3					SC	21.0		20.8 - 22.8 Clayey Sand A/A with locally abundant gravel 20.8 - 21.1 Saturated, otherwise damp
								22.0		
								23.0		TP = 22.8

NOTES: General: USCS is modified for this log as follows:

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(1) Badly broken core, accurate footage measurements not possible.

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Procedure No. RMRS/OPS-PRO.101

Revision 0

Date effective: 12/31/98

Page 27 of 28

## Appendix B

### Precision (DER and RPD) Calculations

# Surface Soil Characterization Precision Results HPGe Survey - Americium-241

Measurement Set	Measurement Location	Northing	Easting	Result Identifier	Isotope	Result	Unit	Qualifier	Counting Error	MDA	TPE	DER
1	4	749504.228	2086712.625	REAL	Am-241	3.6265	pCi/g		1.4611	1.1669	2.549	
2	34	749488.57	2086940.341	RP	Am-241	2.9097	pCi/g		1.3394	1.0471	2.2123	0.2124
3	50	749457.057	2086923.395	REAL	Am-241	8.1133	pCi/g		2.5898	1.3254	5.0238	
4	70	749274.78	2086547.392	RP	Am-241	8.6981	pCi/g		2.7235	1.3118	5.3329	0.0798
5	102	748741.807	2086501.735	REAL	Am-241	10.416	pCi/g		3.1812	1.5454	6.306	
6	92	748758.403	2086788.193	REAL	Am-241	11.62	pCi/g	U	3.43	1.4108	6.9159	0.1286
7	103	748762.927	2086525.162	RP	Am-241	0.87883	pCi/g	U	0	0.87883	0	
8	144	748686.658	2086456.248	REAL	Am-241	0.85795	pCi/g		0	0.85795	0	
9	143	748712.728	2086475.732	REAL	Am-241	23.623	pCi/g		6.5632	1.6698	13.65	
10	188	748543.498	2086617.93	RP	Am-241	22.868	pCi/g		6.4112	1.8841	13.272	0.0397
11	187	748569.785	2086637.588	REAL	Am-241	12.216	pCi/g		9.2351	1.9062	12.9	
12	224	748530.596	2086327.974	REAL	Am-241	13.389	pCi/g		4.0278	1.9814	8.0445	0.0772
13	223	748553.614	2086348.428	REAL	Am-241	27.605	pCi/g		7.9047	2.4216	16.186	
14	293	749282.129	2087177.737	RP	Am-241	25.317	pCi/g		7.2465	2.1482	14.842	0.1042
15	292	749308.922	2087156.342	REAL	Am-241	12.477	pCi/g		3.651	1.5532	7.3941	
16	328	749360.365	2087306.954	REAL	Am-241	12.761	pCi/g		3.762	1.6708	7.5902	0.0268
17	327	749384.141	2087288.334	REAL	Am-241	27.687	pCi/g		7.5668	2.5172	15.873	
				RP	Am-241	25.597	pCi/g		7.0445	2.1576	14.724	0.0965
				REAL	Am-241	13.027	pCi/g		3.9436	1.8399	7.8517	
				RP	Am-241	12.762	pCi/g		3.9288	1.9362	7.7575	0.0240
				REAL	Am-241	11.135	pCi/g		3.3664	1.5574	6.7068	
				RP	Am-241	10.992	pCi/g		3.4046	1.737	6.7023	0.0151
				REAL	Am-241	14.344	pCi/g		4.4282	2.2537	8.7316	
				RP	Am-241	14.75	pCi/g		4.4725	2.1187	8.8974	0.0326
				REAL	Am-241	18.374	pCi/g		5.1655	1.5395	10.678	
				RP	Am-241	18.162	pCi/g		13.326	1.6862	18.774	0.0098
				REAL	Am-241	17.188	pCi/g		4.9867	1.8151	10.143	
				RP	Am-241	14.25	pCi/g		4.0446	1.3885	8.3195	0.2240
				REAL	Am-241	9.5058	pCi/g		2.9194	1.3913	5.7712	
				RP	Am-241	9.5679	pCi/g		2.8826	1.3877	5.753	0.0076
				REAL	Am-241	9.4532	pCi/g		3.0676	1.8115	5.9036	
				RP	Am-241	8.7707	pCi/g		2.8074	1.5745	5.4386	0.0850
				REAL	Am-241	10.356	pCi/g		2.9936	1.1197	6.1004	
				RP	Am-241	9.6353	pCi/g		2.9191	1.4074	5.8097	0.0856

**Surface Soil Characterization Precision Results  
HPGe Survey - Americium-241**

Measurement Set	Measurement Location	Northing	Easting	Result Identifier	Isotope	Result	Unit	Qualifier	Counting Error	MDA	TPE	DER
18	347	749466.89	2087225.351	REAL	Am-241	5.9716	pCi/g		2.3238	1.7649	4.1153	
				RP	Am-241	6.2208	pCi/g		2.2445	1.5527	4.1107	0.0428
19	348	749473.379	2087259.129	REAL	Am-241	8.385	pCi/g		2.4629	1.1926	4.9784	
				RP	Am-241	9.2405	pCi/g		2.6696	1.2176	5.4418	0.1160
20	392	749237.254	2087288.321	REAL	Am-241	17.004	pCi/g		4.8726	1.4883	9.9739	
				RP	Am-241	16.44	pCi/g		4.7944	1.7304	9.7264	0.0405
21	391	749265.725	2087268.341	REAL	Am-241	6.9447	pCi/g		2.3826	1.5166	4.466	
				RP	Am-241	6.4381	pCi/g		2.2561	1.4983	4.1875	0.0827
22	424	749122.144	2086857.564	REAL	Am-241	1.1475	pCi/g	U	0	1.1475	0	
				RP	Am-241	1.1779	pCi/g	U	0	1.1779	0	
23	423	749152.52	2086871.874	REAL	Am-241	4.4217	pCi/g		1.5688	1.0916	2.8954	
				RP	Am-241	4.2258	pCi/g		1.5708	1.1654	2.8385	0.0483
24	466	749030.781	2086645.557	REAL	Am-241	15.333	pCi/g		4.7461	2.3354	9.346	
				RP	Am-241	17.951	pCi/g		5.3281	2.1778	10.713	0.1841
25	465	749061.751	2086627.577	REAL	Am-241	13.115	pCi/g		4.0085	1.8642	7.9431	
				RP	Am-241	14.4	pCi/g		4.3058	1.8275	8.6259	0.1096
26	491	749106.455	2087170.102	REAL	Am-241	14.022	pCi/g		3.9786	1.6359	8.185	
				RP	Am-241	9.585	pCi/g		2.7567	1.2918	5.6322	0.4466
27	493	749103.819	2087136.494	REAL	Am-241	13.086	pCi/g		3.8208	1.5516	7.7467	
				RP	Am-241	13.441	pCi/g		3.9737	1.7761	8.006	0.0319
28	534	748827.728	2086730.163	REAL	Am-241	8.2579	pCi/g		3.0181	2.1792	5.4954	
				RP	Am-241	7.4445	pCi/g		2.6872	1.9295	4.9206	0.1103
29	533	748861.115	2086716.347	REAL	Am-241	18.093	pCi/g		5.1869	1.6254	10.615	
				RP	Am-241	18.444	pCi/g		5.1799	1.3765	10.713	0.0233
30	562	748943.336	2086803.595	REAL	Am-241	14.247	pCi/g		4.756	2.9743	9.0301	
				RP	Am-241	15.912	pCi/g		4.8554	2.4026	9.6289	0.1261
31	563	748908.139	2086813.193	REAL	Am-241	18.874	pCi/g		5.436	2.0473	11.098	
				RP	Am-241	18.221	pCi/g		5.1838	1.8159	10.65	0.0425

# Surface Soil Characterization Precision Results HPGe Survey - Americium-241

Measurement Set	Measurement Location	Northing	Easting	Result Identifier	Isotope	Result	Unit	Qualifier	Counting Error	MDA	TPE	DER
32	587	749006.216	2086641.506	REAL	Am-241	34.057	pCi/g		9.2692	1.583	19.486	
				RP	Am-241	32.102	pCi/g		8.8266	2.0883	18.457	0.0728
33	624	748997.504	2086833.856	REAL	Am-241	20.996	pCi/g		5.8026	2.1069	12.101	
				RP	Am-241	20.006	pCi/g		5.611	2.4666	11.613	0.0590
34	622	748992.091	2086763.165	REAL	Am-241	17.944	pCi/g		5.2004	1.6981	10.584	
				RP	Am-241	17.725	pCi/g		5.173	1.8335	10.49	0.0147
35	666	748633.56	2085991.96	REAL	Am-241	2.5224	pCi/g		1.6399	1.6254	2.3966	
				RP	Am-241	2.1795	pCi/g		1.3419	1.3121	1.9957	0.1099
36	665	748662.599	2086013.852	REAL	Am-241	4.5077	pCi/g		1.8583	1.51	3.2106	
				RP	Am-241	3.5617	pCi/g		1.3985	1.0788	2.467	0.2336
37	705	748554.388	2085849.536	REAL	Am-241	8.0332	pCi/g		2.4323	1.1885	4.8422	
				RP	Am-241	8.1629	pCi/g		2.4687	1.2336	4.9176	0.0188
38	706	748528.91	2085827.994	REAL	Am-241	7.1336	pCi/g		2.526	1.7624	4.6661	
				RP	Am-241	7.8541	pCi/g		2.5948	1.624	4.951	0.1059
39	770	748550.632	2086926.887	REAL	Am-241	5.3532	pCi/g		1.7862	1.1309	3.3922	
				RP	Am-241	4.531	pCi/g		1.6108	1.1273	2.97	0.1824
40	769	748558.501	2086894.845	REAL	Am-241	8.1076	pCi/g		2.6069	1.6674	5.0392	
				RP	Am-241	7.8726	pCi/g		2.5173	1.6321	4.8791	0.0335
41	785	749066.896	2087188.642	REAL	Am-241	8.5245	pCi/g		2.5766	1.1477	5.134	
				RP	Am-241	7.9166	pCi/g		2.4615	1.2636	4.8365	0.0862
42	786	749053.005	2087208.331	REAL	Am-241	23.062	pCi/g		6.3291	1.9225	13.248	
				RP	Am-241	23.685	pCi/g		6.3199	1.6238	13.426	0.0330
43	837	748467.494	2086066.366	REAL	Am-241	5.8762	pCi/g		2.1689	1.526	3.9318	
				RP	Am-241	4.8337	pCi/g		1.6679	1.029	3.118	0.2077
44	836	748458.181	2086097.672	REAL	Am-241	5.4789	pCi/g		1.9885	1.4006	3.6322	
				RP	Am-241	5.6524	pCi/g		2.0624	1.4691	3.7581	0.0332
45	874	748829.304	2087427.728	REAL	Am-241	9.0916	pCi/g		2.89	1.6295	5.6174	
				RP	Am-241	10.742	pCi/g		3.4262	2.0171	6.6487	0.1896
46	873	748800.474	2087445.174	REAL	Am-241	6.7266	pCi/g		2.2551	1.4023	4.2731	
				RP	Am-241	6.6936	pCi/g		2.1906	1.2949	4.1987	0.0055

**Surface Soil Characterization Precision Results  
HPGe Survey - Americium-241**

Measurement Set	Measurement Location	Northing	Easting	Result Identifier	Isotope	Result	Unit	Qualifier	Counting Error	MDA	TPE	DER
47	902	749150.108	2087462.745	REAL	Am-241	1.256	pCi/g	U	0	1.256	0	
				RP	Am-241	1.2546	pCi/g	U	0	1.2546	0	
48	903	749159.127	2087493.409	REAL	Am-241	0.39305	pCi/g	J	0.69657	0.75492	0.81448	
				RP	Am-241	0.67627	pCi/g	J	0.70307	0.7365	0.90595	0.2325
49	946	748935.561	2087258.354	REAL	Am-241	4.6188	pCi/g		1.7668	1.296	3.1524	
				RP	Am-241	3.791	pCi/g		1.8493	1.6354	2.9866	0.1906
50	965	748838.416	2086052.179	REAL	Am-241	24.748	pCi/g		6.8179	1.5779	14.242	
				RP	Am-241	25.012	pCi/g		6.8798	1.6744	14.383	0.0130
51	986	748836.522	2086172.771	REAL	Am-241	20.353	pCi/g		5.627	1.6216	11.733	
				RP	Am-241	20.87	pCi/g		5.7331	1.6008	11.994	0.0308
52	1003	748566.447	2085682.743	REAL	Am-241	1.1398	pCi/g		0.9978	1.0314	1.3397	
				RP	Am-241	0.9303	pCi/g	J	1.065	1.1296	1.3441	0.1104
53	1002	748594.463	2085666.295	REAL	Am-241	1.0946	pCi/g	U	0	1.0946	0	
				RP	Am-241	1.1322	pCi/g	U	0	1.1322	0	
54	1036	748851.904	2087437.883	REAL	Am-241	7.2614	pCi/g		2.4047	1.4711	4.5831	
				RP	Am-241	7.4422	pCi/g		2.3804	1.3392	4.6131	0.0278
55	1055	749317.343	2087419.516	REAL	Am-241	7.1405	pCi/g		2.3449	1.4828	4.4871	
				RP	Am-241	7.6217	pCi/g		2.3994	1.446	4.6859	0.0742
56	1069	749181.174	2087619.571	REAL	Am-241	0.9178	pCi/g	U	0	0.9178	0	
				RP	Am-241	0.91153	pCi/g	U	0	0.91153	0	
57	1107	749240.763	2086516.094	REAL	Am-241	0.9923	pCi/g	U	0	0.9923	0	
				RP	Am-241	1.0416	pCi/g	U	0	1.0416	0	
58	1106	749271.949	2086516.417	REAL	Am-241	0.82887	pCi/g	U	0	0.82887	0	
				RP	Am-241	0.52757	pCi/g	J	1.1216	1.2218	1.2798	0.2354

Suface Soil Characterization Precison Results  
Gamma Spectroscopy - Americium-241

HPGe Measurement Location	Real Sample No.	Radius (m)	QA Sample No.	Real Sample Am241(pCi/g)	Real Sample 2s Counting Error	QA Sample Am241(pCi/g)	QA Sample 2s Counting Error	DER
30	99A5936-002.001	0	99A5936-003.001	2.37	.332	1.71	.276	1.529
	99A5936-004.001	1	99A5936-005.001	4.66	.366	4.46	.374	0.382
	99A5936-006.001	3	99A5936-007.001	3.57	.426	3.2	.313	0.700

HPGe Measurement Location	Real Sample No.	Radius (m)	QA Sample No.	Real Sample Am241(pCi/g)	Real Sample 2s Counting Error	QA Sample Am241(pCi/g)	QA Sample 2s Counting Error	DER
460	98A3372-002.002	0	98A3372-002.007	62.4	6.82	86.6	14.2	1.536
	98A3372-002.004	1	98A3372-002.008	183.	19.9	91.3	9.7	4.142
	98A3372-002.006	3	98A3372-002.009	95.	14.3	106.	12.9	0.571

HPGe Measurement Location	Real Sample No.	Radius (m)	QA Sample No.	Real Sample Am241(pCi/g)	Real Sample 2s Counting Error	QA Sample Am241(pCi/g)	QA Sample 2s Counting Error	DER
669	99A4878-003.001	0	99A4878-004.001	40.8	2.41	75.9	3.35	8.505
	99A4878-005.001	1	99A4878-006.001	55.1	7.35	66.7	3.15	1.451
	99A4878-007.001	3	99A4878-007.001	60.4	3.93	51.	3.93	1.691



## Surface Soil Characterization Program

## Precision Results

## Alpha Spectroscopy

HPGe MEASUREMENT LOCATION	SAMPLE TYPE	SAMPLE NUMBER	ANALYTE	RESULT	UNIT CODE	Q	RC_SIGMA _ERROR	DER
30	Duplicate	99A5936-005.001	Am-241	4.4612	PCI/G		0.3741	0.39
30	Real	99A5936-004.001	Am-241	4.6643	PCI/G		0.3659	
30	Duplicate	99A5936-007.001	Am-241	3.1966	PCI/G		0.3134	0.71
30	Real	99A5936-006.001	Am-241	3.574	PCI/G		0.4259	
30	Duplicate	99A5936-003.001	Am-241	1.7105	PCI/G		0.2759	1.52
30	Real	99A5936-002.001	Am-241	2.3659	PCI/G		0.332	
460	Duplicate	99A3372-002.008	Am-241	172.9098	PCI/G		5.4249	2.69
460	Real	99A3372-002.004	Am-241	151.9866	PCI/G		5.5795	
460	Duplicate	99A3372-002.009	Am-241	145.2979	PCI/G		4.8513	0.99
460	Real	99A3372-002.006	Am-241	137.9899	PCI/G		5.5697	
460	Duplicate	99A3372-002.007	Am-241	175.1638	PCI/G		5.6641	12.16
460	Real	99A3372-002.002	Am-241	90.1227	PCI/G		4.0973	
669	Duplicate	99A4878-006.001	Am-241	66.7147	PCI/G		3.1482	2.74
669	Real	99A4878-005.001	Am-241	55.0517	PCI/G		2.8592	
669	Duplicate	99A4878-008.001	Am-241	51.0332	PCI/G		2.5161	2.35
669	Real	99A4878-007.001	Am-241	60.4235	PCI/G		3.1018	
669	Duplicate	99A4878-004.001	Am-241	75.9211	PCI/G		3.3548	8.49
669	Real	99A4878-003.001	Am-241	40.8194	PCI/G		2.413	
30	Duplicate	99A5936-005.001	Pu-239/240	23.1372	PCI/G		0.8293	1.19
30	Real	99A5936-004.001	Pu-239/240	21.7524	PCI/G		0.8192	
30	Duplicate	99A5936-007.001	Pu-239/240	15.5486	PCI/G		1.2054	5.12
30	Real	99A5936-006.001	Pu-239/240	23.8498	PCI/G		1.0835	
30	Duplicate	99A5936-003.001	Pu-239/240	8.4155	PCI/G		0.7811	4.31
30	Real	99A5936-002.001	Pu-239/240	12.8235	PCI/G		0.6603	
460	Duplicate	99A3372-002.008	Pu-239/240	684.6637	PCI/G		12.2161	36.09
460	Real	99A3372-002.004	Pu-239/240	1481.6998	PCI/G		18.4008	
460	Duplicate	99A3372-002.009	Pu-239/240	841.5062	PCI/G		15.1618	8.94
460	Real	99A3372-002.006	Pu-239/240	675.0613	PCI/G		10.7885	
460	Duplicate	99A3372-002.007	Pu-239/240	782.3574	PCI/G		13.1426	13.22
460	Real	99A3372-002.002	Pu-239/240	554.3172	PCI/G		11.1808	
669	Duplicate	99A4878-006.001	Pu-239/240	435.6164	PCI/G		8.6241	10.35
669	Real	99A4878-005.001	Pu-239/240	318.3239	PCI/G		7.3486	
669	Duplicate	99A4878-008.001	Pu-239/240	297.2583	PCI/G		7.2987	7.13
669	Real	99A4878-007.001	Pu-239/240	376.36	PCI/G		8.3559	
669	Duplicate	99A4878-004.001	Pu-239/240	525.3358	PCI/G		9.415	22.44
669	Real	99A4878-003.001	Pu-239/240	265.908	PCI/G		6.7098	
30	Duplicate	99A5936-005.001	U-233,-234	0.7917	PCI/G	J	0.1928	0.00
30	Real	99A5936-004.001	U-233,-234	0.7905	PCI/G	J	0.184	
30	Duplicate	99A5936-007.001	U-233,-234	0.6254	PCI/G	J	0.1677	0.26
30	Real	99A5936-006.001	U-233,-234	0.5568	PCI/G	J	0.1997	
30	Duplicate	99A5936-003.001	U-233,-234	2.3662	PCI/G		0.6882	2.13
30	Real	99A5936-002.001	U-233,-234	0.8336	PCI/G	J	0.2129	
460	Duplicate	99A3372-002.008	U-233,-234	1.0197	PCI/G		.1613	0.70
460	Real	99A3372-002.004	U-233,-234	.8624	PCI/G	J	.1556	
460	Duplicate	99A3372-002.009	U-233,-234	1.184	PCI/G		.2339	0.16
460	Real	99A3372-002.006	U-233,-234	1.1367	PCI/G		.1879	
460	Duplicate	99A3372-002.007	U-233,-234	.8937	PCI/G	J	.1574	0.95
460	Real	99A3372-002.002	U-233,-234	1.1157	PCI/G		.1721	
669	Duplicate	99A4878-006.001	U-233,-234	0.842	PCI/G	J	0.3213	0.52

## Surface Soil Characterization Program

## Precision Results

## Alpha Spectroscopy

HPGe MEASUREMENT LOCATION	SAMPLE TYPE	SAMPLE NUMBER	ANALYTE	RESULT	UNIT CODE	Q	RC_SIGMA _ERROR	DER
669	Real	99A4878-005.001	U-233,-234	0.6224	PCI/G	J	0.2696	
669	Duplicate	99A4878-008.001	U-233,-234	0.8276	PCI/G	J	0.3128	0.25
669	Real	99A4878-007.001	U-233,-234	0.9393	PCI/G	J	0.326	
669	Duplicate	99A4878-004.001	U-233,-234	0.6928	PCI/G	J	0.4082	0.12
669	Real	99A4878-003.001	U-233,-234	0.7556	PCI/G	J	0.3191	
30	Duplicate	99A5936-005.001	U-235	0.08	PCI/G	J	0.0614	0.52
30	Real	99A5936-004.001	U-235	0.0413	PCI/G	U	0.0433	
30	Duplicate	99A5936-007.001	U-235	0.0434	PCI/G	U	0.0454	0.66
30	Real	99A5936-006.001	U-235	0.1111	PCI/G	U	0.0926	
30	Duplicate	99A5936-003.001	U-235	0.1025	PCI/G	U	0.1417	0.07
30	Real	99A5936-002.001	U-235	0.0907	PCI/G	J	0.0725	
460	Duplicate	99A3372-002.008	U-235	.0883	PCI/G	J	.0489	0.23
460	Real	99A3372-002.004	U-235	.0729	PCI/G	J	.045	
460	Duplicate	99A3372-002.009	U-235	.0837	PCI/G	J	.0618	0.36
460	Real	99A3372-002.006	U-235	.0566	PCI/G	J	.0418	
460	Duplicate	99A3372-002.007	U-235	.0986	PCI/G	J	.0525	0.05
460	Real	99A3372-002.002	U-235	.0948	PCI/G	J	.0505	
669	Duplicate	99A4878-006.001	U-235	0.0524	PCI/G	U	0.0835	0.06
669	Real	99A4878-005.001	U-235	0.0457	PCI/G	U	0.0854	
669	Duplicate	99A4878-008.001	U-235	0.065	PCI/G	U	0.0993	0.84
669	Real	99A4878-007.001	U-235	-0.0205	PCI/G	U	0.0231	
669	Duplicate	99A4878-004.001	U-235	-0.0382	PCI/G	U	0.0431	0.87
669	Real	99A4878-003.001	U-235	0.0463	PCI/G	U	0.0865	
30	Duplicate	99A5936-005.001	U-238	0.9948	PCI/G	J	0.2135	0.53
30	Real	99A5936-004.001	U-238	1.1579	PCI/G		0.2215	
30	Duplicate	99A5936-007.001	U-238	1.0056	PCI/G		0.212	0.05
30	Real	99A5936-006.001	U-238	1.024	PCI/G		0.2661	
30	Duplicate	99A5936-003.001	U-238	2.8263	PCI/G		0.751	2.57
30	Real	99A5936-002.001	U-238	0.823	PCI/G	J	0.211	
460	Duplicate	99A3372-002.008	U-238	2.5451	PCI/G		.2547	1.71
460	Real	99A3372-002.004	U-238	1.9538	PCI/G		.2339	
460	Duplicate	99A3372-002.009	U-238	2.442	PCI/G		.3347	0.50
460	Real	99A3372-002.006	U-238	2.661	PCI/G		.2875	
460	Duplicate	99A3372-002.007	U-238	2.2426	PCI/G		.2482	0.61
460	Real	99A3372-002.002	U-238	2.4613	PCI/G		.2549	
669	Duplicate	99A4878-006.001	U-238	1.4272	PCI/G		0.4037	0.78
669	Real	99A4878-005.001	U-238	1.0122	PCI/G		0.3429	
669	Duplicate	99A4878-008.001	U-238	1.3592	PCI/G		0.3867	0.60
669	Real	99A4878-007.001	U-238	1.0519	PCI/G		0.3389	
669	Duplicate	99A4878-004.001	U-238	1.1399	PCI/G		0.4882	0.02
669	Real	99A4878-003.001	U-238	1.1541	PCI/G		0.3669	

**Subsurface Soil Characterization Program  
Precision Results - Americium-241**

Borehole	Sample Type	RIN/Event/Bottle	Analyte	Result	Unit	Q	Det_Limit	Sigma_Error	DER
90198	Replicate	98A1496-001.014	AM-241	3.93	PCI/G		0.024	0.51	6.803
	Real	98A1496-001.006	AM-241	87	PCI/G		1.09	12.2	
90698	Replicate	98A1055-003.036	AM-241	590	PCI/G		0.224	69.1	5.415
	Real	98A1055-003.033	AM-241	1880	PCI/G		5.13	228	
90798	Replicate	98A1055-002.020	AM-241	0.043	PCI/G	U	0.086	0.044	0.163
	Real	98A1055-002.019	AM-241	0.053	PCI/G	J	0.027	0.043	
91298	Replicate	98A1055-001.011	AM-241	0.32	PCI/G		0.038	0.085	0.817
	Real	98A1055-001.010	AM-241	0.229	PCI/G	J	0.040	0.072	
91598	Replicate	98A1296-001.010	AM-241	13010	PCI/G		94.6	1604	4.548
	Real	98A1296-001.002	AM-241	31670	PCI/G		51.5	3776	
91698	Replicate	98A2017-001.012	AM-241	4030	PCI/G		25.6	546	0.132
	Real	98A2017-001.002	AM-241	3930	PCI/G		53.2	526	
92498	Replicate	98A1502-001.010	AM-241	16.7	PCI/G		0.904	3.38	5.443
	Real	98A1502-001.002	AM-241	59.5	PCI/G		0.118	7.1	
92698	Replicate	98A2022-001.010	AM-241	0.311	PCI/G		0.099	0.133	0.182
	Real	98A2022-001.004	AM-241	0.345	PCI/G		0.059	0.131	
93098	Replicate	99A4353-005.001	AM-241	0.181	PCI/G	J	0.115	0.120	0.819
	Real	99A4353-004.002	AM-241	0.361	PCI/G		0.146	0.184	
93698	Replicate	98A1289-001.010	AM-241	76.8	PCI/G		19.8	23.8	2.805
	Real	98A1289-001.004	AM-241	9.95	PCI/G		0.084	1.31	
94298	Replicate	99A4849-005.002	AM-241	0.26	PCI/G	J	0.123	0.147	1.456
	Real	99A4849-004.002	AM-241	0.026	PCI/G	U	0.107	0.065	
94598	Replicate	98A5489-001.009	AM-241	0.026	PCI/G	U	0.074	0.048	0.090
	Real	98A5489-001.008	AM-241	0.032	PCI/G	U	0.066	0.046	
95298	Replicate	98A5494-001.009	AM-241	0.225	PCI/G	J	0.057	0.105	0.084
	Real	98A5494-001.008	AM-241	0.238	PCI/G	J	0.083	0.114	
95798	Replicate	99A5832-005.002	AM-241	0.031	PCI/G	U	0.123	0.075	0.777
	Real	99A5832-004.002	AM-241	0.13	PCI/G	J	0.113	0.103	
95998	Replicate	99A7799-009.003	AM-241	0.035	PCI/G	U	0.048	0.050	0.317
	Real	99A7799-006.003	AM-241	0.016	PCI/G	U	0.045	0.033	
96298	Replicate	99A3210-004.009	AM-241	0.018	PCI/G	U	0.200	0.110	3.144
	Real	99A3210-004.008	AM-241	1.8	PCI/G		0.143	0.556	
96798	Replicate	99A6650-006.003	AM-241	0	PCI/G	U	0.054	0.000	0.841
	Real	99A6650-005.003	AM-241	0.053	PCI/G	J	0.048	0.063	
97598	Replicate	99A7937-005.001	AM-241	0.301	PCI/G	B	0.041	0.152	0.558
	Real	99A7937-004.002	AM-241	0.194	PCI/G	J	0.041	0.117	
97698	Replicate	99A8275-006.003	AM-241	0	PCI/G	U	0.052	0.000	0.268
	Real	99A8275-001.003	AM-241	0.011	PCI/G	U	0.090	0.041	

**Subsurface Soil Characterization Program  
Precision Results - Plutonium-239/240**

Borehole	Sample Type	RIN/Event/Bottle	Analyte	Result	Unit	Q	Det_Limit	Sigma_Error	DER
90198	Replicate	98A1496-001.014	PU-239	20.6	PCI/G		0.016	2.41	6.951
90198	Real	98A1496-001.006	PU-239	711	PCI/G		6.49	99.3	
90698	Replicate	98A1055-003.036	PU-239	7320	PCI/G		3.04	858	2.211
90698	Real	98A1055-003.033	PU-239	10670	PCI/G		1.91	1249	
90798	Replicate	98A1055-002.020	PU-239	0.039	PCI/G	U	0.040	0.032	0.747
90798	Real	98A1055-002.019	PU-239	0.01	PCI/G	U	0.051	0.022	
91298	Replicate	98A1055-001.011	PU-239	1.5	PCI/G		0.034	0.263	0.028
91298	Real	98A1055-001.010	PU-239	1.49	PCI/G		0.032	0.247	
91598	Replicate	98A1296-001.010	PU-239	70030	PCI/G		37	8213	4.194
91598	Real	98A1296-001.002	PU-239	152260	PCI/G		17.8	17801	
91698	Replicate	98A2017-001.012	PU-239	373	PCI/G		42.5	95.9	0.112
91698	Real	98A2017-001.002	PU-239	389	PCI/G		50.4	106	
92498	Replicate	98A1502-001.010	PU-239	94.8	PCI/G		0.582	12.3	6.547
92498	Real	98A1502-001.002	PU-239	474	PCI/G		0.583	56.6	
92698	Replicate	98A2022-001.010	PU-239	0.464	PCI/G		0.061	0.156	2.378
92698	Real	98A2022-001.004	PU-239	1.22	PCI/G		0.061	0.277	
93098	Replicate	99A4353-005.001	PU-239/240	0.812	PCI/G		0.083	0.291	2.121
93098	Real	99A4353-004.002	PU-239/240	2.33	PCI/G	B	0.037	0.654	
93698	Replicate	98A1289-001.010	PU-239	495	PCI/G		15.3	80.7	5.506
93698	Real	98A1289-001.004	PU-239	49.5	PCI/G		0.049	5.91	
94298	Replicate	99A4849-005.002	PU-239/240	7.35	PCI/G		0.034	1.82	3.760
94298	Real	99A4849-004.002	PU-239/240	0.471	PCI/G		0.033	0.186	
94598	Replicate	98A5489-001.009	PU-239/240	0.08	PCI/G	J	0.020	0.052	0.013
94598	Real	98A5489-001.008	PU-239/240	0.081	PCI/G	J	0.050	0.060	
95298	Replicate	98A5494-001.009	PU-239/240	0.982	PCI/G		0.037	0.291	0.690
95298	Real	98A5494-001.008	PU-239/240	1.31	PCI/G		0.022	0.376	
95798	Replicate	99A5832-005.002	PU-239/240	0.531	PCI/G		0.060	0.205	0.817
95798	Real	99A5832-004.002	PU-239/240	0.816	PCI/G		0.082	0.282	
95998	Replicate	99A7799-009.003	PU-239/240	0	PCI/G	U	0.041	0.000	0.826
95998	Real	99A7799-006.003	PU-239/240	-0.019	PCI/G	U	0.102	0.023	
96298	Replicate	99A3210-004.009	PU-239/240	0.028	PCI/G	U	0.037	0.040	3.245
96298	Real	99A3210-004.008	PU-239/240	1.63	PCI/G		0.070	0.492	
96798	Replicate	99A6650-006.003	PU-239/240	-0.007	PCI/G	U	0.079	0.014	0.500
96798	Real	99A6650-005.003	PU-239/240	0	PCI/G	U	0.052	0.000	
97598	Replicate	99A7937-005.001	PU-239/240	2.88	PCI/G		0.048	0.833	2.187
97598	Real	99A7937-004.002	PU-239/240	0.913	PCI/G		0.085	0.339	
97698	Replicate	99A8275-006.003	PU-239/240	0.037	PCI/G	U	0.049	0.052	0.261
97698	Real	99A8275-001.003	PU-239/240	0.06	PCI/G	J	0.054	0.071	

Subsurface Soil Characterization Program  
Precision Results - Uranium-233/234

Borehole	Sample Type	RIN/Event/Bottle	Analyte	Result	Unit	Q	Det_Limit	Sigma_Error	DER
93098	Replicate	99A4353-005.001	U-233/234	0.575	PCI/G	J	0.035	0.212	0.573
93098	Real	99A4353-004.002	U-233/234	0.773	PCI/G	J	0.040	0.273	
94298	Replicate	99A4849-005.002	U-233/234	0.549	PCI/G	J	0.088	0.209	0.428
94298	Real	99A4849-004.002	U-233/234	0.686	PCI/G	J	0.074	0.242	
94598	Replicate	98A5489-001.009	U-233/234	0.735	PCI/G	J	0.017	0.211	0.214
94598	Real	98A5489-001.008	U-233/234	0.802	PCI/G	J	0.019	0.232	
95298	Replicate	98A5494-001.009	U-233/234	0.652	PCI/G	J	0.033	0.196	0.346
95298	Real	98A5494-001.008	U-233/234	0.562	PCI/G	J	0.017	0.171	
95798	Replicate	99A5832-005.002	U-233/234	0.783	PCI/G	J	0.095	0.272	0.363
95798	Real	99A5832-004.002	U-233/234	0.654	PCI/G	J	0.068	0.228	
95998	Replicate	99A7799-009.003	U-233/234	0.769	PCI/G	J	0.046	0.285	0.880
95998	Real	99A7799-006.003	U-233/234	0.455	PCI/G	J	0.054	0.215	
96298	Replicate	99A3210-004.009	U-233/234	0.4	PCI/G	J	0.076	0.172	0.869
96298	Real	99A3210-004.008	U-233/234	0.656	PCI/G	J	0.038	0.239	
96798	Replicate	99A6650-006.003	U-233/234	0.591	PCI/G	J	0.039	0.226	0.041
96798	Real	99A6650-005.003	U-233/234	0.578	PCI/G	J	0.040	0.225	
97598	Replicate	99A7937-005.001	U-233/234	0.95	PCI/G	J	0.075	0.323	0.061
97598	Real	99A7937-004.002	U-233/234	0.978	PCI/G	J	0.042	0.327	
97698	Replicate	99A8275-006.003	U-233/234	0.407	PCI/G	J	0.050	0.196	0.382
97698	Real	99A8275-001.003	U-233/234	0.519	PCI/G	J	0.079	0.218	
90198	Replicate	98A1496-001.014	U-234	0.756	PCI/G	J	0.024	0.128	1.255
90198	Real	98A1496-001.006	U-234	1.58	PCI/G		0.479	0.644	
90698	Replicate	98A1055-003.036	U-234	1.83	PCI/G	U	2.72	1.75	1.067
90698	Real	98A1055-003.033	U-234	5.14	PCI/G		2.68	2.56	
90798	Replicate	98A1055-002.020	U-234	0.82	PCI/G	J	0.024	0.118	0.231
90798	Real	98A1055-002.019	U-234	0.859	PCI/G	J	0.015	0.121	
91298	Replicate	98A1055-001.011	U-234	0.368	PCI/G	J	0.014	0.062	1.038
91298	Real	98A1055-001.010	U-234	0.284	PCI/G	J	0.012	0.052	
91598	Replicate	98A1296-001.010	U-234	31.5	PCI/G		23.6	20.7	0.415
91598	Real	98A1296-001.002	U-234	19.8	PCI/G	U	30.6	19.1	
91698	Replicate	98A2017-001.012	U-234	14.2	PCI/G	U	27.6	16.7	0.568
91698	Real	98A2017-001.002	U-234	1.83	PCI/G	U	30.1	14.0	
92498	Replicate	98A1502-001.010	U-234	1.47	PCI/G		0.748	0.746	0.928
92498	Real	98A1502-001.002	U-234	0.758	PCI/G	J	0.043	0.181	
92698	Replicate	98A2022-001.010	U-234	0.477	PCI/G	J	0.057	0.145	0.180
92698	Real	98A2022-001.004	U-234	0.442	PCI/G	J	0.059	0.130	
93698	Replicate	98A1289-001.010	U-234	0.883	PCI/G	J	0.037	0.156	1.867
93698	Real	98A1289-001.004	U-234	0.511	PCI/G	J	0.057	0.124	

Subsurface Soil Characterization Program  
Precision Results - Uranium-235

Borehole	Sample Type	RIN/Event/Bottle	Analyte	Result	Unit	Q	Det Limit	Sigma_Error	DER
90198	Replicate	98A1496-001.014	U-235	0.038	PCI/G	J	0.022	0.022	1.016
90198	Real	98A1496-001.006	U-235	0.384	PCI/G	U	0.514	0.34	
90698	Replicate	98A1055-003.036	U-235	0.412	PCI/G	U	1.94	1.03	0.106
90698	Real	98A1055-003.033	U-235	0.577	PCI/G	U	2.42	1.16	
90798	Replicate	98A1055-002.020	U-235	0.045	PCI/G	J	0.014	0.018	0.427
90798	Real	98A1055-002.019	U-235	0.035	PCI/G	J	0.009	0.015	
91298	Replicate	98A1055-001.011	U-235	0.018	PCI/G	J	0.013	0.011	0.774
91298	Real	98A1055-001.010	U-235	0.007	PCI/G	U	0.016	0.009	
91598	Replicate	98A1296-001.010	U-235	-1.748	PCI/G	U	19.2	10.2	0.602
91598	Real	98A1296-001.002	U-235	7.2	PCI/G	U	19.8	10.8	
91698	Replicate	98A2017-001.012	U-235	3.34	PCI/G	U	21.2	12.8	0.224
91698	Real	98A2017-001.002	U-235	-0.913	PCI/G	U	23.2	14.0	
92498	Replicate	98A1502-001.010	U-235	0.438	PCI/G	U	0.603	0.413	0.830
92498	Real	98A1502-001.002	U-235	0.092	PCI/G	J	0.043	0.057	
92698	Replicate	98A2022-001.010	U-235	0.008	PCI/G	U	0.049	0.029	0.341
92698	Real	98A2022-001.004	U-235	0.022	PCI/G	U	0.049	0.029	
93098	Replicate	99A4353-005.001	U-235	0.072	PCI/G	U	0.076	0.075	0.960
93098	Real	99A4353-004.002	U-235	0	PCI/G	U	0.050	0.000	
93698	Replicate	98A1289-001.010	U-235	0.05	PCI/G	J	0.027	0.029	0.439
93698	Real	98A1289-001.004	U-235	0.032	PCI/G	U	0.039	0.029	
94298	Replicate	99A4849-005.002	U-235	0.056	PCI/G	U	0.076	0.066	0.249
94298	Real	99A4849-004.002	U-235	0.034	PCI/G	U	0.091	0.059	
94598	Replicate	98A5489-001.009	U-235	0.031	PCI/G	J	0.021	0.032	0.231
94598	Real	98A5489-001.008	U-235	0.043	PCI/G	J	0.024	0.041	
95298	Replicate	98A5494-001.009	U-235	0.038	PCI/G	U	0.040	0.040	0.307
95298	Real	98A5494-001.008	U-235	0.023	PCI/G	J	0.021	0.028	
95798	Replicate	99A5832-005.002	U-235	0.01	PCI/G	U	0.081	0.037	0.120
95798	Real	99A5832-004.002	U-235	0.017	PCI/G	U	0.084	0.045	
95998	Replicate	99A7799-009.003	U-235	0.084	PCI/G	J	0.057	0.088	0.683
95998	Real	99A7799-006.003	U-235	0.21	PCI/G	J	0.117	0.162	
96298	Replicate	99A3210-004.009	U-235	-0.007	PCI/G	U	0.079	0.014	1.200
96298	Real	99A3210-004.008	U-235	0.113	PCI/G	J	0.083	0.099	
96798	Replicate	99A6650-006.003	U-235	-0.007	PCI/G	U	0.085	0.014	0.919
96798	Real	99A6650-005.003	U-235	0.055	PCI/G	J	0.050	0.066	
97598	Replicate	99A7937-005.001	U-235	0.081	PCI/G	U	0.109	0.093	0.033
97598	Real	99A7937-004.002	U-235	0.077	PCI/G	J	0.052	0.080	
97698	Replicate	99A8275-006.003	U-235	0.114	PCI/G	J	0.062	0.108	0.053
97698	Real	99A8275-001.003	U-235	0.122	PCI/G	J	0.055	0.106	

Subsurface Soil Characterization Project  
Precision Results - Uranium-238

Borehole	Sample Type	RIN/Event/Bottle	Analyte	Result	Unit	Q	Det_Limit	Sigma_Error	DER
90198	Replicate	98A1496-001.014	U-238	0.828	PCI/G	J	0.025	0.137	1.471
90198	Real	98A1496-001.006	U-238	1.9	PCI/G		0.546	0.716	
90698	Replicate	98A1055-003.036	U-238	2.89	PCI/G	U	3.69	2.37	1.289
90698	Real	98A1055-003.033	U-238	7.92	PCI/G		2.42	3.1	
90798	Replicate	98A1055-002.020	U-238	0.689	PCI/G	J	0.020	0.102	1.024
90798	Real	98A1055-002.019	U-238	0.851	PCI/G	J	0.016	0.121	
91298	Replicate	98A1055-001.011	U-238	0.395	PCI/G	J	0.015	0.065	0.879
91298	Real	98A1055-001.010	U-238	0.319	PCI/G	J	0.020	0.057	
91598	Replicate	98A1296-001.010	U-238	90.9	PCI/G		26.9	35	1.571
91598	Real	98A1296-001.002	U-238	28.2	PCI/G		19.8	19.2	
91698	Replicate	98A2017-001.012	U-238	4.18	PCI/G	U	31.9	12.8	0.172
91698	Real	98A2017-001.002	U-238	0.913	PCI/G	U	32.7	14.0	
92498	Replicate	98A1502-001.010	U-238	1.31	PCI/G		0.501	0.68	0.293
92498	Real	98A1502-001.002	U-238	1.1	PCI/G		0.056	0.229	
92698	Replicate	98A2022-001.010	U-238	0.658	PCI/G	J	0.064	0.175	0.628
92698	Real	98A2022-001.004	U-238	0.516	PCI/G	J	0.059	0.143	
93098	Replicate	99A4353-005.001	U-238	0.592	PCI/G	J	0.061	0.217	0.163
93098	Real	99A4353-004.002	U-238	0.645	PCI/G	J	0.072	0.242	
93698	Replicate	98A1289-001.010	U-238	1.62	PCI/G		0.030	0.246	2.922
93698	Real	98A1289-001.004	U-238	0.764	PCI/G	J	0.044	0.159	
94298	Replicate	99A4849-005.002	U-238	0.739	PCI/G	J	0.061	0.253	0.093
94298	Real	99A4849-004.002	U-238	0.773	PCI/G	J	0.073	0.263	
94598	Replicate	98A5489-001.009	U-238	0.659	PCI/G	J	0.035	0.193	0.506
94598	Real	98A5489-001.008	U-238	0.813	PCI/G	J	0.019	0.235	
95298	Replicate	98A5494-001.009	U-238	0.733	PCI/G	J	0.018	0.214	0.495
95298	Real	98A5494-001.008	U-238	0.595	PCI/G	J	0.030	0.179	
95798	Replicate	99A5832-005.002	U-238	0.66	PCI/G	J	0.066	0.240	0.373
95798	Real	99A5832-004.002	U-238	0.792	PCI/G	J	0.067	0.260	
95998	Replicate	99A7799-009.003	U-238	0.854	PCI/G	J	0.096	0.308	0.463
95998	Real	99A7799-006.003	U-238	1.08	PCI/G		0.094	0.379	
96298	Replicate	99A3210-004.009	U-238	0.353	PCI/G	J	0.084	0.161	1.902
96298	Real	99A3210-004.008	U-238	1.06	PCI/G	B	0.038	0.335	
96798	Replicate	99A6650-006.003	U-238	0.798	PCI/G	J	0.069	0.278	0.795
96798	Real	99A6650-005.003	U-238	0.52	PCI/G	J	0.083	0.212	
97598	Replicate	99A7937-005.001	U-238	0.828	PCI/G	J	0.042	0.292	0.147
97598	Real	99A7937-004.002	U-238	0.89	PCI/G	J	0.074	0.306	
97698	Replicate	99A8275-006.003	U-238	0.472	PCI/G	J	0.088	0.216	0.092
97698	Real	99A8275-001.003	U-238	0.5	PCI/G	J	0.078	0.213	

Subsurface Soil Characterization Program  
Precision Results - Relative Percent Difference - VOCs

Borehole	Sample Type	RIN/Event/Bottle	Analyte	Result	Unit	Q	%RPD
92598	Dup	98A1092-001.037	Carbon Tetrachloride	740	UG/KG	U	2.7
92598	Real	98A1092-001.036	Carbon Tetrachloride	720	UG/KG	U	
95998	Dup	99A7799-009.002	Carbon Tetrachloride	6.1	UG/KG	U	3.2
95998	Real	99A7799-006.002	Carbon Tetrachloride	6.3	UG/KG	U	
96298	Dup	99A3210-004.015	Carbon Tetrachloride	700	UG/KG	U	4.4
96298	Real	99A3210-004.014	Carbon Tetrachloride	670	UG/KG	U	
96798	Dup	99A6650-006.002	Carbon Tetrachloride	0.81	UG/KG	J	147
96798	Real	99A6650-005.002	Carbon Tetrachloride	5.3	UG/KG	J	
97698	Dup	99A8275-006.002	Carbon Tetrachloride	5.4	UG/KG	U	1.9
97698	Real	99A8275-001.002	Carbon Tetrachloride	5.3	UG/KG	U	
97698	Dup	99A8275-006.002	1,2-Cis-Dichloroethylene	5.4	UG/KG	U	1.9
97698	Real	99A8275-001.002	1,2-Cis-Dichloroethylene	5.3	UG/KG	U	
96798	Dup	99A6650-006.002	1,2-Cis-Dichloroethylene	6.8	UG/KG	U	74.7
96798	Real	99A6650-005.002	1,2-Cis-Dichloroethylene	14.9	UG/KG		
96298	Dup	99A3210-004.015	1,2-Cis-Dichloroethylene	700	UG/KG	U	4.4
96298	Real	99A3210-004.014	1,2-Cis-Dichloroethylene	670	UG/KG	U	
95998	Dup	99A7799-009.002	1,2-Cis-Dichloroethylene	6.1	UG/KG	U	171.5
95998	Real	99A7799-006.002	1,2-Cis-Dichloroethylene	79.5	UG/KG		
92598	Dup	98A1092-001.037	1,2-Cis-Dichloroethylene	740	UG/KG	U	2.7
92598	Real	98A1092-001.036	1,2-Cis-Dichloroethylene	720	UG/KG	U	
97698	Dup	99A8275-006.002	Tetrachloroethene	5.4	UG/KG	U	1.9
97698	Real	99A8275-001.002	Tetrachloroethene	5.3	UG/KG	U	
96798	Dup	99A6650-006.002	Tetrachloroethene	7.8	UG/KG		161
96798	Real	99A6650-005.002	Tetrachloroethene	72.2	UG/KG		
96298	Dup	99A3210-004.015	Tetrachloroethene	700	UG/KG	U	4.4
96298	Real	99A3210-004.014	Tetrachloroethene	670	UG/KG	U	
95998	Dup	99A7799-009.002	Tetrachloroethene	6.1	UG/KG	U	193
95998	Real	99A7799-006.002	Tetrachloroethene	343	UG/KG	E	
92598	Dup	98A1092-001.037	Tetrachloroethene	740	UG/KG	U	2.7
92598	Real	98A1092-001.036	Tetrachloroethene	720	UG/KG	U	
97698	Dup	99A8275-006.002	Trichloroethene	5.4	UG/KG	U	1.9
97698	Real	99A8275-001.002	Trichloroethene	5.3	UG/KG	U	
96798	Dup	99A6650-006.002	Trichloroethene	0.85	UG/KG	J	179.9
96798	Real	99A6650-005.002	Trichloroethene	16.1	UG/KG		
96298	Dup	99A3210-004.015	Trichloroethene	700	UG/KG	U	4.4
96298	Real	99A3210-004.014	Trichloroethene	670	UG/KG	U	
95998	Dup	99A7799-009.002	Trichloroethene	6.1	UG/KG	U	71.6
95998	Real	99A7799-006.002	Trichloroethene	12.9	UG/KG		
92598	Dup	98A1092-001.037	Trichloroethene	740	UG/KG	U	2.7
92598	Real	98A1092-001.036	Trichloroethene	720	UG/KG	U	

Note: Project specific COCs only.



## Appendix C

### 903 Pad *In-Situ* Models and Uncertainties

## 903 PAD *IN SITU* MODELS AND UNCERTAINTIES

### *In Situ* Models

The Canberra *in situ* systems used to perform measurements at the RFETS 903 Pad project site employ the Canberra In Situ Object Counting System (ISOCS) software. This software package allows the user to calculate efficiencies for *in situ* quantification of defined objects using standard templates. One such template has been used to define the *in situ* measurement of contaminants in soils at the 903 Pad locations. This template requires the entry of various parameters which should accurately represent the actual conditions at the project site.

The template selected for this application is the circular plane source. This template requires the user to define a horizontal source size, a vertical source size, material composition and material density. In addition, the software uses detector specific physical parameters and user definable environmental parameters such as humidity, pressure and temperature. Each of these parameters has been defined in the model to represent actual conditions at 903 Pad, using existing knowledge of the site and project defined parameters. These parameter values, and the basis for selection, are described below.

Use of inappropriate values could lead to errors in *in situ* measurements. The model used for routine measurements contains the values most representative of actual conditions, however it is possible that actual measurement locations may vary from these assumed default conditions. Since it is not possible to verify all parameter values at each measurement location, default values will be used except where it is known that conditions vary significantly. An evaluation of the potential errors associated with deviation from default parameters has been performed and forms the basis of the total propagated measurement uncertainty (TMU) used when reporting *in situ* measurement results. These are also described below.

### Soil Density

The available soil density data from 903 Pad locations shows densities ranging from 1.0 to 1.3 g/cc. *In Situ* soil densities are typically on the order of 1.6 g/cc, but it is believed that, due to the lower moisture content of RFETS soils, this value may be too high. The ISOCS model uses a value of 1.3 g/cc as a mean value for 903 Pad soils.

### Uniformity

The uniformity, or non-uniformity, of contamination, both vertically and horizontally, will impact measurement results. Based on the mode of contamination deposition and on prior survey results (including *in situ* surveys), it is believed that the contamination is relatively uniform within the field of view in the ISOCS systems. This is a reasonable assumption since the *in situ* measurements integrate the readings over nearly 80 sq m areas. Thus, any individual "hot spots" are averaged over the entire area, or volume, and their impacts are minimized. The ISOCS model is based on uniform distributions.

### Environmental Conditions

Environmental temperature, humidity and pressure may impact some measurements. The ISOCS models assume standard environmental conditions; i.e. 20 C, 50 % relative humidity and 760 mm barometric pressure. Normal barometric pressure at RFETS is less, but the impact is negligible, as shown below.

### Detector Parameters

An ISOCS efficiency for each detector has been generated, using the specific detector characteristics, which tend to remain constant for long periods of time. The parameter of concern is the detector surface dead layer, which, if it increases could effect detection of low energy photons. This can be monitored by routine check source counts using a source with a low energy photon, such as Am-241. There have been no changes to these parameters over the course of the 903 Pad Project.

The ISOCS template used for the 903 Pad ISOCS efficiency is attached.

Default soil; Dry Dirt (49O, 27Si, 4Fe, 1.6Mg, 4Ca, 2.7K, 7Al)	Am-241 = 12.2 pCi/g
Dirt 2 (55O, 31Si, 3Fe, 7Al)	Am-241 = 11.6 pCi/g
Dirt 4 (45O, 25Si, 12Fe, 2.5Mg, 4.1Ca, 2Mn, 8.3Al, 0.7Ti)	Am-241 = 15.4 pCi/g

The overall impact of a likely range of compositions is about +/- 25%

#### Soil Density

Soil densities were varied from the minimum of 1.0 to a maximum of 1.6 g/cc.

#### Results

Default density 1.3 g/cc	Am-241 = 12.2 pCi/g
Density 1.6 g/cc	Am-241 = 12.0 pCi/g
Density 1.0 g/cc	Am-241 = 13.8 pCi/g

The overall impact of density changes is about +/- 10 %-

#### Environmental Conditions

The default temperature and relative humidity are close to the ranges at RFETS but the default pressure is 20 % higher than normal barometric pressure at this altitude. However, changing the parameters to the RFETS values had no impact (same Am-241 results).

#### Detector Parameters

Detector characteristics have been shown to be unchanged since factory calibration by verifying response by counting a standard reference material and obtaining the correct result. There is no error assigned to this.

## Data Quality Objectives for Measurement Data

Data Quality Objectives (DQOs) are qualitative and quantitative statements that describe the *in situ* characterization technical and quality objectives, define the appropriate type of data and specify acceptable levels of decision errors used to establish the quality of data. These data are used to assist RMRS in developing remedial action or management actions for the affected areas. For 903 Pad *in situ* measurements, the DQO is:

- To classify surface soils as exceeding Tier I soil action levels. This objective is met by measuring soil concentrations of Am-241, U-235 and U-238. Concentrations of Pu and other U isotopes are derived from these measurements. In order to provide sufficient margin for detection of Tier I levels, detection limits for the three nuclides measurable by *in situ* methods have been set at; 1 pCi/g Am-241, 0.5 pCi/g U-235 and 5.0 pCi/g U-238.

Data Quality Objectives used to validate all data generated by *in situ* measurements include the following: precision, accuracy, sensitivity, completeness, comparability and total uncertainty. For the 903 Pad Project, these are defined as follows:

- Precision A quantitative measure of the reproducibility or degree of agreement among replicate or duplicate measurements of a parameter. For the 903 Pad Project, precision shall be demonstrated by performing duplicate counts of specified soil locations on a frequency not to exceed once per 20 measurement locations. The reproducibility shall be calculate using accepted methods for evaluation of duplicate counting.
- Accuracy The degree of agreement between measured concentration values and the true or known values. For *in situ* measurements, true values are difficult to establish and may be estimated from alternate assay methods. For this project. *In situ* results will be compared to laboratory analyses of discrete soil samples. Comparable measurements at the action levels are expected to agree within +/- 50%. Evaluation of accuracy will be performed by RMRS and Canberra technical representatives.
- Sensitivity Sensitivity limits are defined as that level of radioactivity which, if present, will yield a measured value less than the critical limit with 5% probability. The critical limit is defined as that value which measurements of background will exceed with a 5% probability. Sensitivity limits for three detectable radionuclides are specified above.
- Completeness A quantitative measure expressed as a percentage of valid or acceptable data obtained from a measurement system. A goal of 90% has been set for this project.

## Appendix D

### Summary Statistics

Characterization Report for the  
903 Drum Storage Area,  
903 Lip Area, and Americium Zone

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Page: D-1

## Appendix D

### Summary Statistics

Appendix D. Summary Statistics  
HPGe Data

Descriptive Statistic	HPGe Predicted Data						
	<sup>235</sup> U (pCi/g)	<sup>238</sup> U (pCi/g)	HPGe <sup>241</sup> Am (pCi/g)	95% UCL Predicted <sup>241</sup> Am <sup>1</sup> (pCi/g)	95% UCL Predicted <sup>239/240</sup> Pu <sup>2</sup> (pCi/g)	Best Fit Predicted <sup>241</sup> Am <sup>3</sup> (pCi/g)	Best Fit Predicted <sup>239/240</sup> Pu <sup>4</sup> (pCi/g)
Mean	0.24	4.46	12.60	28.43	201.20	20.19	105.05
Geometric Mean	0.00	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!
Standard Error	1.37E-03	0.02	0.38	0.45	3.00	0.48	3.07
Median	0.23	4.37	9.62	24.80	176.67	16.46	80.94
Mode	0.23	3.63	0.90	15.46	118.91	5.56	10.55
Standard Deviation	0.05	0.67	12.67	15.02	100.11	15.85	102.38
Sample Variance	2.07E-03	0.45	160.54	225.69	10021.87	251.25	10481.30
Kurtosis	4.18	10.50	13.05	18.39	22.63	13.05	13.05
Skewness	-0.12	1.10	2.84	3.36	3.74	2.84	2.84
Coefficient of Variation	0.19	0.15	1.01	0.53	0.50	0.78	0.97
Range	0.51	10.04	115.36	150.48	1060.92	144.31	932.10
Minimum	0.07	1.31	0.38	14.91	115.55	4.91	6.32
Maximum	0.58	11.35	115.74	165.39	1176.47	149.22	938.42
Sum	261.72	4946.04	13985.89	31555.57	223330.46	22414.09	116602.40
Count	1110	1110	1110	1110	1110	1110	1110
Confidence Level (95.0%)	2.68E-03	0.04	0.75	0.88	5.89	0.93	6.02
Number of Detections Above Tier I	0	0	0	0	0	0	0
Number of Detections Above Tier II	0	0	48	162	183	0	82

<sup>1</sup> Predicted <sup>241</sup>Am Based on Regression Equation:  $^{241}\text{Am} = 0.0022 * ^{241}\text{Am}^2 + 1.049 * ^{241}\text{Am} + 14.509$

<sup>2</sup> Predicted <sup>239/240</sup>Pu Based on Regression Equation:  $^{239/240}\text{Pu} = 0.0243 * ^{241}\text{Am}^2 + 6.3749 * ^{241}\text{Am} + 113.12$

<sup>3</sup> Predicted <sup>241</sup>Am Based on Regression Equation:  $^{241}\text{Am} = 1.251 * ^{241}\text{Am} + 4.43$

<sup>4</sup> Predicted <sup>239/240</sup>Pu Based on Regression Equation:  $^{239/240}\text{Pu} = 8.08 * ^{241}\text{Am} + 3.24$



**Appendix D. Summary Statistics**  
**Borehole Radiological Data-903 Pad and Lip Area**

Asphalt					
Descriptive Statistic	U233/234 (pCi/g)	U235 (pCi/g)	U238 (pCi/g)	Pu239/240 (pCi/g)	Am241 (pCi/g)
Mean	0.81	0.05	0.75	0.16	0.07
Geometric Mean	0.80	0.04	0.74	#N/A	0.04
Standard Error	0.05	0.01	0.04	0.13	0.03
Median	0.78	0.04	0.75	0.03	0.04
Mode	#N/A	#N/A	#N/A	#N/A	#N/A
Standard Deviation	0.15	0.03	0.13	0.40	0.10
Sample Variance	0.02	0.00	0.02	0.16	0.01
Kurtosis	1.70	7.01	-1.60	8.85	8.28
Skewness	1.22	2.46	-0.08	2.97	2.84
Coefficient of Variation	0.19	0.72	0.17	2.42	1.46
Range	0.47	0.12	0.32	1.22	0.33
Minimum	0.66	0.01	0.60	0.00	0.02
Maximum	1.13	0.13	0.92	1.22	0.34
Sum	7.27	0.42	6.74	1.48	0.63
Count	9	9	9	9	9
Confidence Level (90.0%)	0.08	0.02	0.07	0.22	0.06

Bedrock					
Descriptive Statistic	U233/234 (pCi/g)	U235 (pCi/g)	U238 (pCi/g)	Pu239/240 (pCi/g)	Am241 (pCi/g)
Mean	0.49	0.04	0.62	0.09	0.04
Geometric Mean	0.45	N/A	0.58	0.05	N/A
Standard Error	0.06	0.01	0.06	0.03	0.02
Median	0.43	0.05	0.69	0.04	0.03
Mode	#N/A	#N/A	#N/A	0.01	0.01
Standard Deviation	0.19	0.03	0.19	0.11	0.06
Sample Variance	0.04	0.00	0.04	0.01	0.00
Kurtosis	1.08	-0.02	0.13	1.89	3.71
Skewness	0.86	0.50	-0.96	1.69	1.51
Coefficient of Variation	0.39	0.81	0.31	1.26	1.54
Range	0.72	0.12	0.63	0.35	0.26
Minimum	0.19	-0.01	0.22	0.01	-0.05
Maximum	0.90	0.11	0.84	0.36	0.21
Sum	5.83	0.51	7.43	1.07	0.50
Count	12	12	12	12	12
Confidence Level (95.0%)	0.11	0.02	0.11	0.06	0.04
Number of Detections Above Tier I	0	0	0	0	0
Number of Detections Above Tier II	0	0	0	0	0

**Appendix D. Summary Statistics**  
**Borehole Radiological Data-903 Pad and Lip Area**

Fill					
Descriptive Statistic	U233/234 (pCi/g)	U235 (pCi/g)	U238 (pCi/g)	Pu239/240 (pCi/g)	Am241 (pCi/g)
Mean	1.06	0.09	1.15	53.75	12.01
Geometric Mean	1.02	0.06	1.00	5.78	1.18
Standard Error	0.11	0.04	0.18	45.95	10.38
Median	0.98	0.06	1.13	4.48	0.85
Mode	0.84	0.07	1.24	#N/A	#N/A
Standard Deviation	0.38	0.13	0.61	159.19	35.97
Sample Variance	0.14	0.02	0.37	25340.90	1294.08
Kurtosis	4.79	11.19	5.53	11.88	11.90
Skewness	1.51	3.30	1.72	3.44	3.44
Coefficient of Variation	0.36	1.43	0.53	2.96	2.99
Range	1.61	0.49	2.60	557.99	125.98
Minimum	0.41	0.00	0.17	0.01	0.02
Maximum	2.02	0.49	2.77	558.00	126.00
Sum	12.25	1.00	13.33	642.14	143.51
Count	12	12	12	12	12
Confidence Level (90.0%)	0.18	0.06	0.29	75.59	17.08
Number of Detections Above Tier I	0	0	0	0	0
Number of Detections Above Tier II	0	0	0	1	1

Native					
Descriptive Statistic	U233/234 (pCi/g)	U235 (pCi/g)	U238 (pCi/g)	Pu239/240 (pCi/g)	Am241 (pCi/g)
Mean	0.51	0.04	0.63	0.27	0.11
Geometric Mean	0.49	N/A	0.60	N/A	N/A
Standard Error	0.02	0.01	0.02	0.06	0.03
Median	0.48	0.03	0.59	0.05	0.04
Mode	0.58	0.02	0.66	0.01	0.00
Standard Deviation	0.16	0.05	0.21	0.53	0.25
Sample Variance	0.02	0.00	0.04	0.28	0.06
Kurtosis	13.79	2.25	4.58	9.25	31.76
Skewness	2.74	1.65	1.72	2.94	5.20
Coefficient of Variation	0.31	1.10	0.33	2.00	2.32
Range	1.12	0.22	1.16	2.86	1.81
Minimum	0.28	-0.01	0.30	-0.02	-0.01
Maximum	1.40	0.21	1.46	2.84	1.80
Sum	36.37	3.18	45.03	19.18	7.70
Count	72	72	72	72	72
Confidence Level (95.0%)	0.04	0.01	0.05	0.12	0.06
Number of Detections Above Tier I	0	0	0	0	0
Number of Detections Above Tier II	0	0	0	0	0

**Appendix D. Summary Statistics**  
**Borehole Radiological Data-903 Pad and Lip Area**

Native 1					
Descriptive Statistic	U233/234 (pCi/g)	U235 (pCi/g)	U238 (pCi/g)	Pu239/240 (pCi/g)	Am241 (pCi/g)
Mean	5.31	0.60	16.83	3595.75	775.68
Geometric Mean	1.43	N/A	1.99	146.69	30.48
Standard Error	2.91	0.30	12.58	2462.86	514.23
Median	0.99	0.06	1.32	152.00	34.80
Mode	1.14	0.04	1.54	#N/A	#N/A
Standard Deviation	22.90	2.38	99.08	19392.56	4049.07
Sample Variance	524.52	5.65	9817.55	376071264.13	16394945.59
Kurtosis	55.37	38.00	60.51	59.32	58.16
Skewness	7.30	5.87	7.74	7.63	7.53
Coefficient of Variation	4.31	3.94	5.89	5.39	5.22
Range	177.58	17.81	779.51	152259.18	31669.85
Minimum	0.42	-0.91	0.49	0.82	0.15
Maximum	178.00	16.90	780.00	152260.00	31670.00
Sum	329.51	37.38	1043.61	222936.51	48092.47
Count	62	62	62	62	62
Confidence Level (95.0%)	5.70	0.59	24.66	4827.10	1007.87
Number of Detections Above Tier I	0	0	1	9	12
Number of Detections Above Tier II	0	0	1	27	27

Native 2					
Descriptive Statistic	U233/234 (pCi/g)	U235 (pCi/g)	U238 (pCi/g)	Pu239/240 (pCi/g)	Am241 (pCi/g)
Mean	1.00	0.16	1.50	122.11	25.23
Geometric Mean	0.76	N/A	0.98	8.65	1.79
Standard Error	0.18	0.11	0.29	41.76	8.90
Median	0.73	0.04	0.88	7.62	1.50
Mode	1.63	0.02	0.40	#N/A	#N/A
Standard Deviation	1.42	0.83	2.32	328.85	70.12
Sample Variance	2.00	0.69	5.39	108142.37	4916.12
Kurtosis	49.56	61.25	24.30	15.58	16.02
Skewness	6.73	7.80	4.59	3.81	3.82
Coefficient of Variation	1.41	5.08	1.55	2.69	2.78
Range	11.36	6.58	15.40	1819.87	405.97
Minimum	0.04	-0.01	0.30	0.14	0.03
Maximum	11.40	6.57	15.70	1820.00	406.00
Sum	62.21	10.12	92.74	7571.08	1564.40
Count	62	62	62	62	62
Confidence Level (95.0%)	0.35	0.21	0.58	81.86	17.45
Number of Detections Above Tier I	0	0	0	2	2
Number of Detections Above Tier II	0	0	0	7	8

**Appendix D. Summary Statistics**  
**Borehole Radiological Data-903 Pad and Lip Area**

Native 3					
Descriptive Statistic	U233/234 (pCi/g)	U235 (pCi/g)	U238 (pCi/g)	Pu239/240 (pCi/g)	Am241 (pCi/g)
Mean	0.70	0.05	0.96	16.24	3.14
Geometric Mean	0.59	N/A	0.71	1.33	N/A
Standard Error	0.06	0.01	0.16	5.09	1.07
Median	0.61	0.03	0.64	0.94	0.23
Mode	0.38	0.02	0.57	0.06	0.25
Standard Deviation	0.44	0.06	1.23	40.12	8.46
Sample Variance	0.19	0.00	1.52	1609.25	71.49
Kurtosis	14.59	16.55	32.01	20.03	23.95
Skewness	3.03	3.70	5.22	4.19	4.60
Coefficient of Variation	0.63	1.23	1.28	2.47	2.69
Range	3.11	0.37	9.00	246.99	54.41
Minimum	0.01	-0.01	0.10	0.01	-0.01
Maximum	3.12	0.36	9.10	247.00	54.40
Sum	43.32	2.92	59.60	1007.14	194.71
Count	62	62	62	62	62
Confidence Level (95.0%)	0.11	0.01	0.31	9.99	2.10
Number of Detections Above Tier I	0	0	0	0	0
Number of Detections Above Tier II	0	0	0	0	1

Native 4					
Descriptive Statistic	U233/234 (pCi/g)	U235 (pCi/g)	U238 (pCi/g)	Pu239/240 (pCi/g)	Am241 (pCi/g)
Mean	0.58	0.03	0.64	4.97	0.90
Geometric Mean	0.54	N/A	0.59	N/A	N/A
Standard Error	0.03	0.00	0.04	1.40	0.23
Median	0.55	0.03	0.59	0.80	0.23
Mode	0.76	0.01	0.63	34.50	0.15
Standard Deviation	0.21	0.02	0.29	10.63	1.72
Sample Variance	0.04	0.00	0.08	112.97	2.95
Kurtosis	1.50	2.86	6.66	9.49	6.52
Skewness	1.03	0.19	1.96	3.04	2.67
Coefficient of Variation	0.36	0.74	0.45	2.14	1.92
Range	1.05	0.15	1.78	54.00	7.68
Minimum	0.27	-0.05	0.19	0.00	-0.05
Maximum	1.32	0.10	1.97	54.00	7.63
Sum	33.44	1.79	37.07	288.35	51.98
Count	58	58	58	58	58
Confidence Level (95.0%)	0.05	0.01	0.07	2.74	0.44
Number of Detections Above Tier I	0	0	0	0	0
Number of Detections Above Tier II	0	0	0	0	1

N/A Not Applicable

Appendix D. Summary Statistics  
VOC Borehole Data

Descriptive Statistic	Native					
	Carbon Tetrachloride (µg/Kg)	Tetrachloroethene (µg/Kg)	Trichloroethene (µg/Kg)	Chloroform <sup>a</sup> (µg/Kg)	Cis-1,2- Dichloroethene (µg/Kg)	Methylene Chloride <sup>a</sup> (µg/Kg)
Mean	351.59	438.75	344.72	351.36	838.40	385.12
Geometric Mean	47.84	51.01	47.91	40.84	742.11	36.97
Standard Error	50.73	94.02	50.33	50.76	148.57	60.20
Median	6.00	24.80	6.30	6.20	700.00	5.90
Mode	5.30	5.30	5.30	700.00	700.00	5.30
Standard Deviation	427.48	797.76	424.12	427.68	742.86	507.21
Sample Variance	182742.10	636420.43	179878.11	182907.29	551839.00	257264.17
Kurtosis	-0.37	35.93	-0.24	-0.37	24.87	-0.12
Skewness	0.82	5.21	0.87	0.82	4.98	1.06
Coefficient of Variation	1.22	1.82	1.23	1.22	0.89	1.32
Range	1494.90	6099.22	1497.00	1499.36	3790.00	1699.41
Minimum	5.10	0.78	3.00	0.64	610.00	0.59
Maximum	1500.00	6100.00	1500.00	1500.00	4400.00	1700.00
Sum	24962.60	31589.97	24475.40	24946.28	20960.00	27343.80
Count	71	72	71	71	25	71
Confidence Level (95.0%)	99.43	184.27	98.65	99.48	291.19	117.98
Number of Detections Above Current Tier I SSAL	0	0	0	0	0	0
Number of Samples at 10% of Current Tier I SSAL	0	6	5	0	1	25
Number of Detections Above Proposed Tier I SSAL	0	1	0	0	0	25
Number of Detections Above Proposed Tier II SSAL	31	33	31	0	25	37
Number of Non Detections	70	55	66	64	24	36
Number of Detections	1	17	5	7	1	35

Appendix D. Summary Statistics  
VOC Borehole Data

Descriptive Statistic	Bedrock					
	Carbon Tetrachloride (µg/Kg)	Tetrachloroethene (µg/Kg)	Trichloroethene (µg/Kg)	Chloroform <sup>a</sup> (µg/Kg)	Cis-1,2- Dichloroethene (µg/Kg)	Methylene Chloride <sup>a</sup> (µg/Kg)
Mean	428.37	458.71	428.85	427.25	698.57	493.06
Geometric Mean	71.75	87.43	73.06	45.48	697.70	59.10
Standard Error	117.96	122.44	117.83	118.24	13.88	151.12
Median	620.00	660.00	620.00	620.00	700.00	390.00
Mode	700.00	700.00	700.00	700.00	700.00	700.00
Standard Deviation	456.84	458.13	456.36	457.95	36.71	585.27
Sample Variance	208701.85	209885.96	208265.48	209715.19	1347.62	342541.03
Kurtosis	0.23	0.20	0.23	0.21	4.75	-0.20
Skewness	0.73	0.63	0.73	0.72	-2.05	0.96
Coefficient of Variation	1.07	1.00	1.06	1.07	0.05	1.19
Range	1497.70	1498.40	1499.11	1499.40	110.00	1699.17
Minimum	2.30	1.60	0.89	0.60	620.00	0.83
Maximum	1500.00	1500.00	1500.00	1500.00	730.00	1700.00
Sum	6425.50	6421.90	6432.79	6408.79	4890.00	7395.93
Count	15	14	15	15	7	15
Confidence Level (95.0%)	231.19	239.98	230.95	231.75	27.19	296.18
Number of Detections Above Current Tier I SSAL	0	0	0	0	0	0
Number of Samples at 10% of Current Tier I SSAL	1	1	1	0	0	6
Number of Detections Above Proposed Tier I SSAL	0	0	0	0	0	6
Number of Detections Above Proposed Tier II SSAL	8	8	8	8	7	9
Number of Non Detections	13	12	13	10	7	7
Number of Detections	2	2	2	5	0	8

Appendix D. Summary Statistics  
VOC Borehole Data

Descriptive Statistic	All					
	Carbon Tetrachloride (µg/Kg)	Tetrachloroethene (µg/Kg)	Trichloroethene (µg/Kg)	Chloroform <sup>a</sup> (µg/Kg)	Cis-1,2- Dichloroethene (µg/Kg)	Methylene Chloride <sup>a</sup> (µg/Kg)
Mean	364.98	442.00	359.40	364.59	807.81	403.95
Geometric Mean	51.34	55.69	51.57	41.62	732.16	40.12
Standard Error	46.47	80.96	46.19	46.51	116.05	56.03
Median	6.25	56.35	6.80	6.25	700.00	13.85
Mode	5.30	700.00	5.30	700.00	700.00	5.30
Standard Deviation	430.96	750.84	428.33	431.29	656.46	519.60
Sample Variance	185726.80	563753.37	183468.61	186010.08	430940.22	269980.52
Kurtosis	-0.33	37.87	-0.23	-0.34	31.79	-0.16
Skewness	0.79	5.21	0.83	0.79	5.63	1.03
Coefficient of Variation	1.18	1.70	1.19	1.18	0.81	1.29
Range	1497.70	6099.22	1499.11	1499.40	3790.00	1699.41
Minimum	2.30	0.78	0.89	0.60	610.00	0.59
Maximum	1500.00	6100.00	1500.00	1500.00	4400.00	1700.00
Sum	31388.10	38011.87	30908.19	31355.07	25850.00	34739.73
Count	86	86	86	86	32	86
Confidence Level (95.0%)	91.08	158.69	90.53	91.15	227.45	109.82
Number of Detections Above Proposed Tier I SSAL	0	1	0	0	0	10
Number of Detections Above Proposed Tier II SSAL	0	7	1	0	1	22
Number of Non Detections	83	67	79	74	31	43
Number of Detections	3	19	7	12	1	43
Number of DLs Above Proposed Tier I <sup>b</sup> SSAL	0	0	0	0	0	21
Number of DLs Above Proposed Tier II <sup>b</sup> SSAL	39	37	38	39	31	24

<sup>a</sup> Denotes that analyte has been omitted as a COC due to detections in the laboratory blanks

<sup>b</sup> Includes only non detections

DL Detection Limit

## **Appendix E**

### **Electronic Copy of Analytical Database Electronic Copy of RFCA Tier I and Tier II RSAL Calculation Results**



**Appendix E**  
**HPGe Data**

STAKE NUMBER	Easting	Northing	U-235	U-238	Am-241	95% UCL Predicted Am-241	95% UCL Predicted Pu-239/240	Best Fit Predicted Am-241	Best Fit Predicted Pu-239/240
STAKE 001	2086660	749529.8	0.21	3.63	0.86	15.41	118.61	5.50	10.18
STAKE 002	2086695	749530.9	0.21	3.58	2.39	17.03	128.53	7.43	22.59
STAKE 003	2086678	749501.1	0.20	3.51	0.81	15.36	118.31	5.45	9.80
STAKE 004	2086713	749504.2	0.19	3.45	3.63	18.34	136.56	8.97	32.54
STAKE 005	2086732	749533.8	0.21	3.60	1.81	16.42	124.77	6.70	17.90
STAKE 006	2086749	749506.3	0.07	2.15	5.09	19.91	146.20	10.80	44.36
STAKE 007	2086762	749535.7	0.20	3.57	3.57	18.28	136.18	8.90	32.08
STAKE 008	2086781	749506.7	0.14	3.45	5.59	20.45	149.54	11.43	48.44
STAKE 009	2086800	749538.2	0.23	4.05	4.54	19.32	142.59	10.12	39.96
STAKE 010	2086819	749508.7	0.23	4.04	5.73	20.59	150.44	11.60	49.53
STAKE 011	2086833	749539.6	0.23	3.99	2.87	17.54	131.64	8.02	26.46
STAKE 012	2086852	749510.9	0.23	3.99	5.08	19.89	146.11	10.78	44.26
STAKE 013	2086871	749541.2	0.22	4.01	4.11	18.86	139.75	9.58	36.48
STAKE 014	2086887	749514.3	0.21	3.79	6.32	21.23	154.38	12.34	54.30
STAKE 015	2086903	749545.9	0.22	3.96	5.17	19.99	146.71	10.90	45.00
STAKE 016	2086920	749517.6	0.22	3.87	5.90	20.78	151.60	11.82	50.94
STAKE 017	2086937	749548.9	0.23	3.98	2.73	17.39	130.68	7.84	25.27
STAKE 018	2086957	749519	0.22	3.94	4.89	19.69	144.88	10.55	42.76
STAKE 019	2086975	749548.2	0.13	3.97	3.32	18.02	134.55	8.58	30.07
STAKE 020	2086991	749523.1	0.21	3.86	4.15	18.90	140.00	9.62	36.78
STAKE 021	2087007	749551.7	0.22	3.96	3.69	18.41	136.98	9.05	33.07
STAKE 022	2087025	749523.7	0.22	3.84	4.84	19.64	144.53	10.48	42.33
STAKE 023	2087041	749553.6	0.23	3.96	4.27	19.03	140.77	9.77	37.72
STAKE 024	2087061	749527.8	0.21	3.67	6.01	20.89	152.31	11.95	51.80
STAKE 025	2087074	749557.9	0.22	3.83	3.35	18.04	134.72	8.62	30.27
STAKE 026	2087094	749529.5	0.22	3.89	3.74	18.46	137.27	9.10	33.42
STAKE 027	2087112	749557.1	0.23	3.89	2.40	17.04	128.59	7.44	22.67
STAKE 028	2087129	749532.5	0.22	3.93	1.57	16.16	123.17	6.39	15.90
STAKE 029	2087146	749562.2	0.22	4.00	3.37	18.07	134.87	8.64	30.46
STAKE 030	2087180	749564.8	0.22	3.81	1.11	15.67	120.20	5.81	12.17
STAKE 031	2087046	749494.7	0.22	3.98	1.02	15.58	119.64	5.71	11.47
STAKE 032	2087011	749491.9	0.21	3.90	7.38	22.37	161.50	13.66	62.88
STAKE 033	2086977	749489.9	0.22	3.97	8.89	24.01	171.70	15.55	75.05
STAKE 034	2086940	749488.6	0.21	3.91	8.11	23.16	166.44	14.58	68.80
STAKE 035	2086908	749485.3	0.23	3.97	8.01	23.05	165.72	14.45	67.94
STAKE 036	2086874	749483.4	0.21	3.85	9.21	24.36	173.92	15.96	77.69
STAKE 037	2086838	749480.7	0.22	4.06	6.73	21.66	157.09	12.84	57.58
STAKE 038	2086802	749478.1	0.21	3.84	7.24	22.22	160.54	13.49	61.73
STAKE 039	2086769	749476	0.22	3.97	5.40	20.24	148.26	11.19	46.88
STAKE 040	2086733	749474.4	0.23	4.03	1.43	16.01	122.27	6.22	14.77
STAKE 041	2086699	749471.9	0.21	3.74	0.90	15.46	118.89	5.56	10.53
STAKE 043	2086685	749441.6	0.22	3.95	8.19	23.24	166.93	14.67	69.38
STAKE 044	2086719	749444	0.21	3.75	7.79	22.81	164.26	14.18	66.19
STAKE 045	2086753	749445	0.23	3.94	8.52	23.60	169.18	15.08	72.05
STAKE 046	2086789	749447.2	0.23	4.04	12.26	27.70	194.96	19.77	102.33
STAKE 047	2086822	749449.3	0.23	3.90	8.24	23.31	167.33	14.74	69.86
STAKE 048	2086858	749451.8	0.21	3.73	17.25	33.25	230.28	26.00	142.58
STAKE 049	2086892	749454.6	0.22	2.89	18.48	34.65	239.23	27.55	152.56
STAKE 050	2086923	749457.1	0.22	3.96	10.42	25.67	182.16	17.46	87.40
STAKE 051	2086958	749461	0.22	3.99	5.06	19.87	145.98	10.76	44.11
STAKE 052	2086875	749423.5	0.23	4.03	0.96	15.52	119.27	5.63	11.00

**Appendix E**  
**HPGe Data**

STAKE NUMBER	Easting	Northing	U-235	U-238	Am-241	95% UCL Predicted Am-241	95% UCL Predicted Pu-239/240	Best Fit Predicted Am-241	Best Fit Predicted Pu-239/240
STAKE 053	2086840	749421.8	0.22	4.02	1.07	15.63	119.95	5.76	11.86
STAKE 054	2086803	749419.3	0.23	4.08	3.91	18.65	138.44	9.33	34.85
STAKE 055	2086685	749285.1	0.22	3.88	0.99	15.55	119.43	5.66	11.21
STAKE 056	2086717	749291.1	0.23	4.02	1.81	16.41	124.72	6.69	17.84
STAKE 057	2086752	749296.6	0.24	4.07	1.06	15.62	119.90	5.76	11.80
STAKE 058	2086787	749306.1	0.22	4.11	2.18	16.81	127.14	7.16	20.86
STAKE 059	2086822	749313.2	0.23	3.94	3.14	17.83	133.40	8.36	28.64
STAKE 060	2086856	749321	0.22	3.89	5.50	20.35	148.94	11.32	47.71
STAKE 061	2086887	749330	0.23	3.87	8.30	23.36	167.69	14.81	70.28
STAKE 062	2086920	749342.4	0.23	3.84	6.09	20.98	152.88	12.06	52.49
STAKE 063	2086949	749356.8	0.21	3.72	3.95	18.69	138.70	9.38	35.18
STAKE 064	2086981	749367.5	0.22	3.81	7.92	22.96	165.13	14.34	67.24
STAKE 065	2087013	749380.5	0.22	3.81	6.52	21.45	155.74	12.59	55.95
STAKE 066	2087045	749396.4	0.20	3.57	6.24	21.14	153.84	12.24	53.66
STAKE 067	2086650	749284.9	0.21	3.74	0.89	15.44	118.80	5.54	10.41
STAKE 068	2086616	749278	0.22	3.95	1.57	16.16	123.19	6.39	15.92
STAKE 069	2086581	749276.9	0.25	4.30	0.95	15.51	119.18	5.62	10.90
STAKE 070	2086547	749274.8	0.22	3.89	0.88	15.43	118.74	5.53	10.34
STAKE 071	2086435	748842.5	0.28	4.52	1.03	15.59	119.68	5.71	11.52
STAKE 072	2086466	748834.5	0.25	4.17	0.66	15.21	117.36	5.26	8.60
STAKE 073	2086499	748825.2	0.27	4.55	1.06	15.62	119.90	5.75	11.79
STAKE 074	2086534	748821.3	0.28	4.62	1.59	16.19	123.34	6.42	16.11
STAKE 075	2086568	748816.2	0.25	4.32	1.10	15.67	120.16	5.81	12.13
STAKE 076	2086602	748813.4	0.27	4.52	3.02	17.70	132.60	8.21	27.65
STAKE 077	2086445	748809.3	0.23	4.05	8.31	23.38	167.81	14.83	70.42
STAKE 078	2086476	748799.3	0.23	3.94	21.19	37.72	259.10	30.94	174.44
STAKE 079	2086512	748793.8	0.25	4.43	22.58	39.32	269.46	32.68	185.69
STAKE 080	2086547	748787.8	0.27	4.76	18.53	34.70	239.56	27.61	152.93
STAKE 081	2086581	748786.5	0.31	5.80	28.12	45.75	311.60	39.61	230.46
STAKE 082	2086615	748782.2	0.34	6.07	25.08	42.20	288.26	35.80	205.86
STAKE 083	2086637	748807.5	0.33	5.88	7.05	22.02	159.30	13.26	60.24
STAKE 084	2086650	748778.6	0.33	5.99	15.75	31.57	219.53	24.13	130.48
STAKE 085	2086671	748803.8	0.29	4.85	6.27	21.17	154.01	12.27	53.86
STAKE 086	2086682	748772.9	0.31	5.66	16.12	31.98	222.16	24.59	133.45
STAKE 087	2086706	748798	0.30	5.65	8.57	23.66	169.53	15.15	72.48
STAKE 088	2086718	748767.4	0.28	5.28	16.28	32.17	223.37	24.80	134.81
STAKE 089	2086743	748793	0.30	5.83	5.07	19.89	146.10	10.78	44.25
STAKE 090	2086755	748763.4	0.31	5.51	14.37	30.04	209.73	22.40	119.33
STAKE 091	2086776	748789	0.30	5.48	3.87	18.60	138.16	9.27	34.51
STAKE 092	2086788	748758.4	0.32	5.78	12.22	27.65	194.62	19.71	101.95
STAKE 093	2086812	748784.5	0.31	5.39	1.41	15.99	122.14	6.19	14.61
STAKE 094	2086822	748753.5	0.28	5.28	14.03	29.66	207.32	21.98	116.58
STAKE 095	2086844	748778.7	0.30	5.39	1.37	15.95	121.91	6.15	14.32
STAKE 096	2086858	748751	0.31	5.75	9.87	25.08	178.43	16.78	83.01
STAKE 097	2086892	748743.8	0.34	6.07	5.92	20.80	151.73	11.84	51.10
STAKE 098	2086452	748776.1	0.26	5.03	33.85	52.53	356.73	46.77	276.72
STAKE 099	2086431	748749.9	0.32	5.74	32.70	51.16	347.52	45.33	267.42
STAKE 100	2086467	748745.1	0.24	4.44	20.40	36.83	253.31	29.96	168.10
STAKE 1000	2085697	748599	0.23	4.31	0.61	15.15	117.02	5.19	8.17
STAKE 1001	2085713	748568.9	0.21	3.87	1.95	16.56	125.62	6.86	18.96
STAKE 1002	2085666	748594.5	0.22	4.12	1.09	15.66	120.13	5.80	12.08

256

**Appendix E**  
**HPGe Data**

STAKE NUMBER	Easting	Northing	U-235	U-238	Am-241	95% UCL Predicted Am-241	95% UCL Predicted Pu-239/240	Best Fit Predicted Am-241	Best Fit Predicted Pu-239/240
STAKE 1003	2085683	748566.4	0.20	3.61	1.14	15.71	120.42	5.86	12.45
STAKE 1004	2085630	748595	0.22	4.03	1.01	15.57	119.60	5.70	11.42
STAKE 1005	2085646	748567.7	0.21	3.72	0.87	15.43	118.70	5.52	10.29
STAKE 1006	2085597	748595	0.23	4.19	1.09	15.65	120.07	5.79	12.02
STAKE 1007	2085614	748566.8	0.22	3.82	0.88	15.43	118.76	5.53	10.36
STAKE 1008	2086111	748894.1	0.13	4.76	33.87	52.56	356.93	46.80	276.93
STAKE 1009	2086143	748893.3	0.21	4.03	10.80	26.09	184.78	17.94	90.48
STAKE 101	2086487	748769.4	0.28	5.12	18.91	35.13	242.34	28.08	156.02
STAKE 1010	2086125	748865.1	0.26	4.81	7.70	22.72	163.67	14.07	65.48
STAKE 1011	2086157	748865.8	0.22	3.98	8.12	23.17	166.47	14.59	68.83
STAKE 1012	2085795	748647.8	0.38	6.91	3.07	17.75	132.90	8.27	28.02
STAKE 1013	2085762	748642.8	0.14	3.64	1.65	16.24	123.69	6.49	16.56
STAKE 1014	2085723	748644.1	0.18	3.33	1.47	16.06	122.54	6.27	15.11
STAKE 1015	2085708	748673.8	0.17	3.22	3.22	17.91	133.91	8.46	29.27
STAKE 1016	2085739	748668	0.20	3.55	5.06	19.87	145.97	10.75	44.09
STAKE 1017	2085770	748672.1	0.20	3.56	0.90	15.46	118.91	5.56	10.55
STAKE 1018	2085792	748696.5	0.20	3.66	9.63	24.81	176.75	16.47	81.03
STAKE 1019	2085826	748700	0.22	3.94	24.20	41.18	281.62	34.70	198.78
STAKE 102	2086502	748741.8	0.27	4.71	23.62	40.52	277.27	33.98	194.11
STAKE 1020	2085859	748697.4	0.23	4.13	3.89	18.62	138.29	9.30	34.68
STAKE 1021	2085882	748720.2	0.24	4.31	12.18	27.61	194.36	19.67	101.65
STAKE 1022	2085893	748754.7	0.23	4.07	3.18	17.87	133.67	8.41	28.97
STAKE 1023	2085812	748619.4	0.58	11.35	4.47	19.24	142.07	10.02	39.32
STAKE 1024	2085778	748615.9	0.28	6.17	1.86	16.47	125.05	6.76	18.26
STAKE 1025	2086291	748451.1	0.24	4.27	9.87	25.07	178.39	16.77	82.96
STAKE 1026	2087595	748909.5	0.18	3.72	1.19	15.76	120.73	5.92	12.84
STAKE 1027	2087576	748843.8	0.20	3.61	0.92	15.47	118.99	5.58	10.66
STAKE 1028	2087555	748862.8	0.24	4.24	1.05	15.61	119.83	5.74	11.71
STAKE 1029	2087502	748883.8	0.22	4.15	8.05	23.10	166.03	14.50	68.30
STAKE 103	2086525	748762.9	0.30	5.46	27.61	45.14	307.62	38.96	226.29
STAKE 1030	2087545	748833	0.19	3.60	0.97	15.53	119.31	5.64	11.06
STAKE 1031	2087509	748828.5	0.24	4.73	6.48	21.40	155.48	12.54	55.63
STAKE 1032	2087410	748801.9	0.22	3.95	7.81	22.83	164.37	14.20	66.32
STAKE 1033	2087400	748833.9	0.25	4.56	8.25	23.31	167.37	14.75	69.91
STAKE 1034	2087381	748807.9	0.22	3.88	4.51	19.28	142.34	10.07	39.65
STAKE 1035	2087370	748833.2	0.25	4.55	5.62	20.48	149.73	11.46	48.66
STAKE 1036	2087438	748851.9	0.22	4.00	7.26	22.24	160.69	13.51	61.91
STAKE 1037	2087145	748944.5	0.22	4.06	1.40	15.98	122.10	6.18	14.57
STAKE 1038	2087123	748942.2	0.27	4.81	7.04	22.00	159.20	13.24	60.12
STAKE 1039	2087139	748922	0.23	4.10	2.20	16.83	127.28	7.19	21.04
STAKE 104	2086541	748734.2	0.27	4.82	14.52	30.21	210.83	22.60	120.59
STAKE 1040	2087113	748909.6	0.28	5.02	2.51	17.16	129.29	7.57	23.55
STAKE 1041	2087064	748811.6	0.31	5.68	1.39	15.97	122.02	6.17	14.46
STAKE 1042	2087066	748782.3	0.31	5.44	1.32	15.90	121.58	6.08	13.91
STAKE 1043	2087044	748794.5	0.29	5.15	1.29	15.86	121.36	6.04	13.63
STAKE 1044	2087012	748790.5	0.27	4.96	1.21	15.78	120.88	5.95	13.03
STAKE 1045	2087035	748761.9	0.23	4.02	0.89	15.45	118.82	5.55	10.44
STAKE 1046	2087009	748757.5	0.27	4.71	1.09	15.66	120.10	5.79	12.05
STAKE 1047	2086986	748775.1	0.28	4.82	1.05	15.62	119.86	5.75	11.75
STAKE 1048	2086983	748748.4	0.27	4.77	1.14	15.71	120.43	5.86	12.46
STAKE 1049	2086958	748765	0.26	4.71	1.01	15.57	119.59	5.69	11.41

257

**Appendix E**  
**HPGe Data**

STAKE NUMBER	Easting	Northing	U-235	U-238	Am-241	95% UCL Predicted Am-241	95% UCL Predicted Pu-239/240	Best Fit Predicted Am-241	Best Fit Predicted Pu-239/240
STAKE 105	2086562	748756.4	0.15	5.84	22.00	38.65	265.10	31.95	180.97
STAKE 1050	2086937	748759.9	0.25	4.59	1.14	15.71	120.45	5.86	12.49
STAKE 1051	2086967	748789.4	0.23	4.17	2.72	17.38	130.63	7.83	25.21
STAKE 1052	2086945	748784.8	0.27	4.91	8.73	23.84	170.63	15.35	73.79
STAKE 1053	2086986	748804.4	0.22	3.90	0.92	15.47	119.00	5.58	10.66
STAKE 1054	2087013	748807.7	0.24	4.54	1.56	16.15	123.11	6.38	15.83
STAKE 1055	2087420	749317.3	0.13	3.98	7.14	22.11	159.88	13.36	60.94
STAKE 1056	2087479	749229.9	0.14	3.63	11.02	26.34	186.34	18.22	92.31
STAKE 1057	2087513	749232.3	0.10	3.96	7.68	22.69	163.49	14.03	65.27
STAKE 1058	2087463	749198.1	0.27	4.69	1.18	15.75	120.69	5.91	12.79
STAKE 1059	2087498	749199.8	0.20	3.79	1.18	15.75	120.71	5.91	12.81
STAKE 106	2086577	748729.4	0.29	5.52	18.03	34.14	235.94	26.98	148.91
STAKE 1060	2087545	749234.6	0.09	3.94	8.91	24.03	171.82	15.57	75.20
STAKE 1061	2087534	749204.5	0.28	3.63	13.74	29.34	205.30	21.62	114.26
STAKE 1062	2087519	749171.7	0.21	3.89	1.88	16.49	125.19	6.78	18.42
STAKE 1063	2087567	749205.1	0.20	3.64	11.78	27.17	191.61	19.17	98.45
STAKE 1064	2087554	749177.4	0.20	3.80	11.54	26.91	189.94	18.87	96.51
STAKE 1065	2087585	749178.1	0.19	3.55	4.40	19.17	141.65	9.94	38.81
STAKE 1066	2087601	749207.2	0.26	4.54	1.16	15.73	120.54	5.88	12.60
STAKE 1067	2087635	749209.9	0.25	4.53	1.15	15.72	120.48	5.87	12.53
STAKE 1068	2087580	749236.5	0.14	4.05	3.68	18.40	136.93	9.04	33.00
STAKE 1069	2087620	749181.2	0.15	4.18	0.92	15.47	118.99	5.58	10.66
STAKE 107	2086597	748755.9	0.30	5.14	16.28	32.17	223.33	24.79	134.77
STAKE 1070	2087591	749270.4	0.24	4.39	1.13	15.70	120.35	5.84	12.37
STAKE 1071	2087612	749240.7	0.27	4.81	1.21	15.78	120.86	5.94	13.01
STAKE 1072	2087604	749154	0.23	3.92	0.90	15.46	118.91	5.56	10.55
STAKE 1073	2087559	749267	0.19	4.07	7.20	22.18	160.29	13.44	61.43
STAKE 1074	2087574	749152.5	0.09	3.48	1.38	15.96	121.97	6.16	14.40
STAKE 1075	2087525	749264.8	0.11	3.67	6.93	21.89	158.47	13.10	59.24
STAKE 1076	2087505	749291.6	0.20	3.59	9.26	24.41	174.24	16.01	78.06
STAKE 1077	2087540	749146.7	0.23	4.19	1.11	15.68	120.24	5.82	12.23
STAKE 1078	2087506	749141.1	0.24	4.40	1.18	15.75	120.66	5.90	12.75
STAKE 1079	2087592	749126.4	0.16	3.99	0.89	15.44	118.81	5.54	10.42
STAKE 108	2086609	748724.3	0.29	5.44	16.40	32.31	224.22	24.95	135.77
STAKE 1080	2086739	749415.4	0.13	3.76	2.58	17.23	129.76	7.66	24.12
STAKE 1081	2086771	749416.7	0.23	4.30	0.92	15.47	118.99	5.58	10.65
STAKE 1082	2086755	749388.1	0.21	3.83	0.91	15.46	118.91	5.56	10.56
STAKE 1083	2086785	749387	0.23	4.33	1.12	15.69	120.32	5.84	12.32
STAKE 1084	2086824	749395.4	0.21	3.88	0.85	15.40	118.54	5.49	10.09
STAKE 1085	2086855	749399.4	0.24	4.34	1.09	15.66	120.11	5.80	12.06
STAKE 1086	2086911	749426.4	0.15	3.79	0.85	15.40	118.55	5.49	10.09
STAKE 1087	2086941	749429.4	0.23	4.32	1.09	15.66	120.12	5.80	12.08
STAKE 1088	2086978	749442.8	0.21	3.65	0.85	15.40	118.53	5.49	10.07
STAKE 1089	2086994	749463.4	0.23	4.25	1.74	16.34	124.29	6.61	17.30
STAKE 109	2086631	748750.5	0.29	5.11	13.17	28.70	201.28	20.90	109.64
STAKE 1090	2087045	749394.5	0.18	3.25	6.63	21.56	156.42	12.72	56.77
STAKE 1091	2087075	749413.5	0.21	3.88	10.60	25.88	183.44	17.69	88.90
STAKE 1092	2087105	749427.9	0.17	3.37	3.14	17.82	133.37	8.36	28.60
STAKE 1093	2087136	749446.2	0.19	3.51	4.34	19.10	141.26	9.86	38.32
STAKE 1094	2087166	749463.6	0.17	3.08	2.39	17.03	128.51	7.42	22.57
STAKE 1095	2087194	749482.1	0.19	3.50	1.01	15.57	119.58	5.69	11.40

258

**Appendix E**  
**HPGe Data**

STAKE NUMBER	Easting	Northing	U-235	U-238	Am-241	95% UCL Predicted Am-241	95% UCL Predicted Pu-239/240	Best Fit Predicted Am-241	Best Fit Predicted Pu-239/240
STAKE 1096	2087226	749500.9	0.18	1.38	2.60	17.25	129.83	7.68	24.21
STAKE 1097	2087255	749520.7	0.21	3.78	1.24	15.82	121.08	5.99	13.29
STAKE 1098	2087562	749114.9	0.18	3.46	0.78	15.33	118.10	5.40	9.53
STAKE 1099	2086602	749205.9	0.23	4.37	19.59	35.90	247.29	28.93	161.49
STAKE 110	2086642	748719.7	0.30	5.54	14.83	30.55	213.01	22.98	123.07
STAKE 1100	2086592	749179	0.22	3.83	12.15	27.57	194.13	19.62	101.37
STAKE 1101	2086570	749203.2	0.27	4.66	1.01	15.57	119.61	5.70	11.43
STAKE 1102	2086560	749176.4	0.24	3.95	0.98	15.54	119.39	5.66	11.16
STAKE 1103	2086577	749146.6	0.23	4.19	11.74	27.12	191.28	19.11	98.07
STAKE 1104	2086552	749145.3	0.22	3.94	3.71	18.43	137.10	9.07	33.22
STAKE 1105	2086522	749021.2	0.19	3.46	38.39	58.02	393.68	52.46	313.45
STAKE 1106	2086516	749271.9	0.11	3.47	0.83	15.38	118.42	5.47	9.94
STAKE 1107	2086516	749240.8	0.22	3.91	0.99	15.55	119.47	5.67	11.26
STAKE 1108	2086516	749205.3	0.20	3.60	0.82	15.37	118.38	5.46	9.88
STAKE 1109	2086513	749174.3	0.23	4.25	18.99	35.22	242.92	28.18	156.65
STAKE 111	2086664	748744.5	0.30	5.07	12.47	27.93	196.37	20.03	103.97
STAKE 1110	2086511	749138.3	0.17	3.75	18.98	35.21	242.88	28.18	156.61
STAKE 1111	2086509	749107.3	0.24	4.40	23.80	40.72	278.61	34.20	195.54
STAKE 112	2086678	748714.9	0.27	5.13	14.98	30.72	214.10	23.18	124.31
STAKE 113	2086697	748740.3	0.26	4.72	14.19	29.84	208.48	22.18	117.90
STAKE 114	2086708	748710.7	0.27	5.01	11.66	27.04	190.76	19.02	97.46
STAKE 115	2086732	748735.7	0.25	4.52	13.58	29.16	204.17	21.42	112.97
STAKE 116	2086744	748704.7	0.29	5.34	13.23	28.77	201.69	20.98	110.11
STAKE 117	2086764	748729.3	0.27	4.67	10.69	25.98	184.07	17.81	89.65
STAKE 118	2086777	748697.7	0.28	5.07	11.37	26.72	188.72	18.65	95.08
STAKE 119	2086795	748724.3	0.25	4.48	10.82	26.12	184.97	17.97	90.70
STAKE 120	2086815	748696	0.29	5.24	9.94	25.15	178.86	16.86	83.53
STAKE 121	2086856	748655.2	0.28	5.13	12.94	28.45	199.65	20.61	107.76
STAKE 122	2086836	748630.6	0.26	4.57	10.69	25.97	184.02	17.80	89.59
STAKE 123	2086825	748663.2	0.29	3.96	9.81	25.01	177.98	16.70	82.48
STAKE 124	2086805	748637.8	0.26	4.63	10.83	26.12	184.99	17.97	90.72
STAKE 125	2086792	748669.6	0.22	5.43	11.35	26.70	188.58	18.63	94.92
STAKE 126	2086770	748641.1	0.27	4.60	10.18	25.42	180.56	17.17	85.52
STAKE 127	2086757	748672.9	0.28	4.92	11.40	26.76	188.97	18.69	95.37
STAKE 128	2086733	748648.3	0.25	5.29	13.50	29.08	203.64	21.32	112.35
STAKE 129	2086724	748670.7	0.27	4.74	12.21	27.64	194.57	19.70	101.88
STAKE 130	2086704	748651.7	0.31	5.58	13.75	29.34	205.33	21.63	114.30
STAKE 131	2086693	748680.9	0.27	5.01	10.02	25.24	179.44	16.97	84.21
STAKE 132	2086664	748663.1	0.24	4.37	6.41	21.32	154.98	12.45	55.03
STAKE 133	2086655	748689.4	0.29	5.40	15.60	31.40	218.45	23.94	129.26
STAKE 134	2086635	748659.4	0.29	5.41	18.31	34.46	238.01	27.34	151.21
STAKE 135	2086622	748692.3	0.28	5.28	17.58	33.63	232.70	26.42	145.29
STAKE 136	2086601	748663.8	0.23	4.21	8.61	23.71	169.82	15.20	72.82
STAKE 137	2086587	748694.8	0.27	5.12	16.92	32.89	227.95	25.60	139.96
STAKE 138	2086567	748671.2	0.23	4.05	9.34	24.50	174.80	16.12	78.73
STAKE 139	2086555	748700.2	0.29	5.39	19.08	35.32	243.59	28.30	157.40
STAKE 140	2086535	748675.3	0.25	4.37	15.55	31.35	218.13	23.88	128.89
STAKE 141	2086519	748704.7	0.31	5.78	19.84	36.19	249.16	29.25	163.54
STAKE 142	2086492	748681.3	0.25	4.57	16.31	32.20	223.56	24.83	135.02
STAKE 143	2086476	748712.7	0.21	6.02	27.69	45.24	308.25	39.07	226.95
STAKE 144	2086456	748686.7	0.28	4.76	12.48	27.94	196.44	20.04	104.05

**Appendix E**  
**HPGe Data**

STAKE NUMBER	Easting	Northing	U-235	U-238	Am-241	95% UCL Predicted Am-241	95% UCL Predicted Pu-239/240	Best Fit Predicted Am-241	Best Fit Predicted Pu-239/240
STAKE 145	2086444	748717.8	0.33	5.98	28.71	46.43	316.13	40.34	235.18
STAKE 146	2086423	748693.1	0.26	4.49	20.80	37.27	256.19	30.44	171.26
STAKE 147	2086410	748721.9	0.31	5.72	29.58	47.46	322.95	41.43	242.25
STAKE 148	2086391	748696.5	0.24	4.36	22.75	39.51	270.70	32.89	187.04
STAKE 149	2086380	748639.9	0.28	5.19	18.13	34.25	236.66	27.11	149.70
STAKE 150	2086401	748664.6	0.24	4.33	24.45	41.48	283.54	35.02	200.82
STAKE 1500	2086365	748671.9	0.27	5.08	24.86	41.95	286.63	35.53	204.12
STAKE 151	2086413	748635.1	0.27	4.96	28.09	45.72	311.40	39.58	230.24
STAKE 152	2086433	748657.6	0.24	4.36	19.93	36.28	249.79	29.36	164.23
STAKE 153	2086446	748627.7	0.27	5.18	25.94	43.20	294.84	36.88	212.84
STAKE 154	2086465	748652.4	0.25	4.43	13.69	29.28	204.95	21.56	113.86
STAKE 155	2086478	748623.1	0.27	5.12	18.15	34.28	236.85	27.14	149.92
STAKE 156	2086500	748646.9	0.25	4.35	15.67	31.49	219.01	24.04	129.89
STAKE 157	2086518	748617.2	0.27	5.15	13.99	29.61	207.05	21.93	116.27
STAKE 158	2086542	748641.8	0.25	4.40	11.12	26.44	186.98	18.34	93.05
STAKE 159	2086553	748612.4	0.28	5.38	15.33	31.10	216.52	23.60	127.07
STAKE 160	2086578	748634.3	0.25	4.32	10.68	25.96	183.95	17.79	89.50
STAKE 161	2086595	748606.5	0.26	4.66	9.18	24.32	173.68	15.91	77.40
STAKE 162	2086613	748633.7	0.28	5.36	19.59	35.90	247.32	28.94	161.52
STAKE 163	2086628	748601.8	0.27	4.66	6.08	20.97	152.79	12.04	52.38
STAKE 164	2086645	748626.2	0.30	5.63	8.32	23.39	167.87	14.84	70.51
STAKE 165	2086659	748597.8	0.31	5.82	6.17	21.06	153.37	12.15	53.08
STAKE 166	2086680	748625.2	0.11	4.63	11.85	27.25	192.06	19.25	98.97
STAKE 167	2086690	748595.2	0.18	5.60	12.00	27.42	193.14	19.45	100.22
STAKE 168	2086713	748621.3	0.22	3.90	10.04	25.26	179.57	16.99	84.36
STAKE 169	2086725	748587.9	0.30	5.47	8.85	23.96	171.43	15.50	74.74
STAKE 170	2086746	748613.4	0.22	4.03	10.14	25.37	180.27	17.12	85.18
STAKE 171	2086351	748643.1	0.28	5.05	21.60	38.19	262.13	31.45	177.74
STAKE 172	2086356	748611.7	0.28	5.38	29.50	47.37	322.30	41.33	241.58
STAKE 173	2086391	748606.3	0.27	4.64	23.09	39.91	273.30	33.32	189.84
STAKE 174	2086368	748580.8	0.30	5.58	19.95	36.31	249.98	29.39	164.44
STAKE 175	2086421	748599.4	0.26	4.53	16.15	32.03	222.44	24.64	133.76
STAKE 176	2086401	748574.2	0.31	5.62	16.78	32.73	226.92	25.42	138.81
STAKE 177	2086456	748595.6	0.26	4.65	10.13	25.36	180.17	17.10	85.07
STAKE 178	2086437	748569.2	0.30	5.44	19.30	35.57	245.20	28.57	159.18
STAKE 179	2086494	748591.1	0.25	4.48	11.29	26.63	188.16	18.55	94.43
STAKE 180	2086470	748566.5	0.18	5.00	15.48	31.28	217.63	23.80	128.33
STAKE 181	2086531	748585.8	0.27	4.79	13.60	29.18	204.33	21.45	113.14
STAKE 182	2086508	748560.7	0.30	5.60	14.93	30.66	213.71	23.11	123.87
STAKE 183	2086569	748579.8	0.28	4.86	9.97	25.19	179.11	16.91	83.81
STAKE 184	2086546	748555.3	0.31	5.49	13.81	29.41	205.76	21.70	114.79
STAKE 185	2086604	748573.7	0.29	4.95	11.12	26.44	186.99	18.34	93.06
STAKE 186	2086582	748549	0.32	5.74	14.28	29.94	209.11	22.29	118.62
STAKE 187	2086638	748569.8	0.29	5.00	11.14	26.46	187.12	18.36	93.21
STAKE 188	2086618	748543.5	0.29	5.32	13.03	28.55	200.29	20.73	108.50
STAKE 189	2086668	748563.3	0.21	5.13	9.94	25.15	178.88	16.86	83.55
STAKE 190	2086649	748539	0.29	5.29	13.49	29.05	203.50	21.30	112.20
STAKE 191	2086709	748560.2	0.26	4.67	6.94	21.89	158.51	13.11	59.28
STAKE 192	2086688	748530.2	0.32	5.83	14.42	30.10	210.11	22.47	119.77
STAKE 193	2086741	748555.5	0.29	5.29	10.57	25.84	183.21	17.65	88.64
STAKE 194	2086720	748524	0.29	5.26	8.17	23.23	166.82	14.65	69.25

260

**Appendix E**  
**HPGe Data**

STAKE NUMBER	Easting	Northing	U-235	U-238	Am-241	95% UCL Predicted Am-241	95% UCL Predicted Pu-239/240	Best Fit Predicted Am-241	Best Fit Predicted Pu-239/240
STAKE 195	2086801	748492.8	0.31	5.63	9.87	25.08	178.41	16.78	83.00
STAKE 196	2086755	748525.7	0.12	5.45	10.47	25.74	182.56	17.53	87.87
STAKE 197	2086782	748464.8	0.27	4.83	6.56	21.49	156.00	12.64	56.26
STAKE 198	2086786	748520.9	0.32	5.10	9.03	24.16	172.67	15.73	76.21
STAKE 199	2086767	748495.4	0.31	5.43	6.21	21.11	153.64	12.20	53.42
STAKE 200	2086749	748471.8	0.27	4.59	7.55	22.55	162.63	13.87	64.24
STAKE 201	2086735	748501.7	0.30	5.51	9.71	24.90	177.33	16.58	81.72
STAKE 202	2086712	748473.5	0.24	4.28	8.62	23.72	169.91	15.22	72.93
STAKE 203	2086699	748503.2	0.28	4.96	8.66	23.76	170.18	15.27	73.25
STAKE 204	2086676	748478.5	0.25	4.35	7.00	21.96	158.95	13.19	59.81
STAKE 205	2086661	748509.6	0.29	5.11	8.05	23.10	166.04	14.51	68.32
STAKE 206	2086643	748484.4	0.24	4.29	7.14	22.11	159.88	13.36	60.94
STAKE 207	2086631	748515.1	0.28	5.20	11.16	26.49	187.30	18.39	93.43
STAKE 208	2086606	748490	0.26	4.67	7.15	22.13	159.97	13.38	61.05
STAKE 209	2086594	748523.8	0.26	4.99	10.93	26.24	185.70	18.10	91.55
STAKE 210	2086571	748498	0.24	4.31	9.37	24.53	174.97	16.15	78.93
STAKE 211	2086558	748524.6	0.31	5.73	13.84	29.45	206.00	21.74	115.07
STAKE 212	2086539	748497.7	0.18	4.57	10.01	25.23	179.40	16.96	84.15
STAKE 213	2086524	748529.1	0.30	5.71	11.11	26.43	186.94	18.33	93.00
STAKE 214	2086500	748505.3	0.27	4.72	11.01	26.33	186.28	18.21	92.23
STAKE 215	2086488	748536.7	0.31	5.64	10.46	25.72	182.47	17.52	87.76
STAKE 216	2086464	748510.6	0.26	4.42	10.91	26.21	185.55	18.08	91.38
STAKE 217	2086451	748540	0.20	5.50	15.85	31.69	220.28	24.26	131.32
STAKE 218	2086431	748517.5	0.24	4.27	9.44	24.60	175.44	16.24	79.48
STAKE 219	2086418	748546.4	0.29	5.43	16.84	32.79	227.33	25.49	139.27
STAKE 220	2086397	748522.2	0.24	4.33	12.90	28.41	199.41	20.57	107.48
STAKE 221	2086382	748549.2	0.25	4.38	13.40	28.96	202.89	21.19	111.50
STAKE 222	2086364	748528.3	0.28	5.24	18.72	34.92	240.97	27.85	154.50
STAKE 223	2086348	748553.6	0.26	4.54	18.37	34.53	238.46	27.42	151.70
STAKE 224	2086328	748530.6	0.29	5.46	14.34	30.01	209.56	22.37	119.14
STAKE 225	2086342	748498.9	0.27	4.62	8.98	24.11	172.35	15.67	75.83
STAKE 226	2086316	748476.1	0.32	5.97	15.54	31.35	218.08	23.88	128.84
STAKE 227	2086371	748492.9	0.24	4.10	10.52	25.78	182.85	17.59	88.21
STAKE 228	2086352	748469.6	0.31	5.81	14.83	30.55	212.99	22.98	123.05
STAKE 229	2086407	748487.9	0.23	4.00	8.90	24.02	171.80	15.57	75.18
STAKE 230	2086389	748463.5	0.29	5.53	12.61	28.09	197.39	20.21	105.15
STAKE 231	2086440	748481.7	0.22	3.97	7.85	22.88	164.69	14.26	66.71
STAKE 232	2086421	748459.8	0.45	5.84	14.33	29.99	209.44	22.35	119.00
STAKE 233	2086476	748477	0.23	4.10	9.04	24.17	172.71	15.73	76.25
STAKE 234	2086455	748452.9	0.33	6.19	14.60	30.29	211.38	22.70	121.22
STAKE 235	2086511	748471.3	0.24	4.20	6.52	21.45	155.75	12.59	55.96
STAKE 236	2086490	748446.4	0.32	5.88	10.68	25.96	183.94	17.78	89.49
STAKE 237	2086548	748465.2	0.24	4.31	7.34	22.33	161.23	13.61	62.56
STAKE 238	2086526	748440.5	0.28	5.11	6.90	21.85	158.24	13.06	58.97
STAKE 239	2086584	748459.2	0.25	4.41	9.05	24.18	172.80	15.75	76.36
STAKE 240	2086559	748434.9	0.28	5.21	5.54	20.38	149.15	11.36	47.97
STAKE 241	2086326	748443.7	0.28	4.93	9.55	24.73	176.22	16.38	80.40
STAKE 242	2086306	748419.8	0.23	5.60	6.83	21.78	157.81	12.98	58.45
STAKE 243	2086362	748437.4	0.28	4.87	7.17	22.15	160.10	13.40	61.20
STAKE 244	2086340	748412.5	0.30	5.41	5.49	20.33	148.82	11.29	47.56
STAKE 245	2086396	748428.7	0.26	4.59	7.64	22.66	163.26	13.99	65.00

261

**Appendix E**  
**HPGe Data**

STAKE NUMBER	Easting	Northing	U-235	U-238	Am-241	95% UCL Predicted Am-241	95% UCL Predicted Pu-239/240	Best Fit Predicted Am-241	Best Fit Predicted Pu-239/240
STAKE 246	2086373	748405.9	0.29	5.43	8.51	23.60	169.14	15.08	72.01
STAKE 247	2086321	748618.4	0.22	4.88	1.11	15.68	120.26	5.82	12.25
STAKE 248	2086289	748624.1	0.29	5.41	23.43	40.30	275.83	33.74	192.56
STAKE 249	2086328	748587	0.26	4.54	19.29	35.56	245.11	28.56	159.08
STAKE 250	2086299	748592.7	0.32	5.64	1.41	15.99	122.15	6.19	14.63
STAKE 251	2086310	748559.9	0.17	4.90	2.69	17.35	130.44	7.80	24.97
STAKE 252	2086279	748568.9	0.30	5.55	15.80	31.63	219.90	24.19	130.90
STAKE 253	2086267	748599	0.26	4.68	18.81	35.01	241.60	27.96	155.19
STAKE 254	2086245	748576	0.32	5.80	20.21	36.60	251.85	29.71	166.50
STAKE 255	2086286	748534.7	0.12	5.02	1.15	15.72	120.50	5.87	12.56
STAKE 256	2086256	748540.9	0.30	5.55	16.25	32.14	223.14	24.76	134.55
STAKE 257	2086296	748508.5	0.29	4.95	2.27	16.90	127.69	7.26	21.55
STAKE 258	2086263	748518.1	0.31	5.68	6.29	21.19	154.17	12.30	54.05
STAKE 260	2086617	749237.8	0.23	4.30	2.20	16.83	127.25	7.18	21.00
STAKE 261	2086637	749211	0.26	4.85	1.71	16.31	124.12	6.57	17.09
STAKE 262	2086650	749240.3	0.24	4.39	7.62	22.63	163.14	13.97	64.84
STAKE 263	2086671	749214	0.27	5.02	32.34	50.73	344.66	44.88	264.51
STAKE 264	2086683	749245	0.24	4.36	5.47	20.31	148.69	11.27	47.41
STAKE 265	2086704	749219.2	0.27	5.06	39.29	59.12	401.09	53.58	320.70
STAKE 266	2086717	749249.5	0.24	4.34	9.11	24.25	173.24	15.83	76.89
STAKE 267	2086740	749226	0.27	4.94	19.04	35.28	243.31	28.25	157.09
STAKE 268	2086753	749254.5	0.22	4.15	21.13	37.66	258.69	30.87	173.99
STAKE 269	2086772	749230.1	0.27	5.00	30.48	48.53	330.00	42.56	249.52
STAKE 270	2086786	749258.8	0.26	4.09	23.50	40.37	276.33	33.83	193.10
STAKE 271	2086806	749233.8	0.19	4.97	36.95	56.28	381.88	50.66	301.83
STAKE 272	2086823	749264.5	0.22	4.11	18.92	35.15	242.45	28.10	156.13
STAKE 273	2086840	749239.8	0.26	5.02	31.48	49.71	337.86	43.81	257.57
STAKE 274	2086854	749268.9	0.22	4.05	26.29	43.61	297.50	37.32	215.65
STAKE 275	2086872	749243.2	0.25	4.68	28.43	46.11	314.02	40.00	232.98
STAKE 276	2086888	749272.8	0.23	4.17	19.29	35.56	245.13	28.56	159.10
STAKE 277	2086908	749248.8	0.25	4.82	21.63	38.23	262.39	31.49	178.03
STAKE 278	2086923	749277.8	0.23	4.17	16.14	32.01	222.33	24.62	133.64
STAKE 279	2086942	749252.4	0.25	4.79	15.22	30.99	215.80	23.47	126.24
STAKE 280	2086955	749282.8	0.23	4.26	15.39	31.17	216.95	23.68	127.55
STAKE 281	2086977	749257.6	0.25	4.59	12.63	28.11	197.49	20.23	105.27
STAKE 282	2086989	749289.1	0.24	4.21	11.29	26.63	188.16	18.55	94.42
STAKE 283	2087009	749260.3	0.26	4.85	13.87	29.48	206.21	21.78	115.30
STAKE 284	2087023	749291.2	0.22	4.03	15.56	31.36	218.18	23.89	128.95
STAKE 285	2087044	749264.1	0.25	4.68	13.17	28.70	201.28	20.90	109.64
STAKE 286	2087059	749295.7	0.09	4.07	14.10	29.74	207.86	22.07	117.19
STAKE 287	2087077	749269.7	0.26	4.77	13.41	28.97	202.96	21.20	111.57
STAKE 288	2087090	749300.4	0.22	4.02	9.28	24.43	174.35	16.04	78.20
STAKE 289	2087112	749272.8	0.25	4.91	9.19	24.33	173.74	15.92	77.48
STAKE 290	2087124	749303.9	0.21	4.02	10.40	25.66	182.06	17.44	87.29
STAKE 291	2087145	749278.1	0.25	4.76	15.40	31.19	217.08	23.70	127.70
STAKE 292	2087156	749308.9	0.23	4.21	9.51	24.68	175.91	16.32	80.05
STAKE 293	2087178	749282.1	0.25	4.60	17.19	33.19	229.87	25.93	142.12
STAKE 294	2087192	749312.8	0.23	4.17	6.81	21.75	157.65	12.95	58.25
STAKE 295	2087212	749286.6	0.25	4.69	13.52	29.10	203.78	21.35	112.51
STAKE 296	2087227	749317.7	0.23	4.05	5.15	19.97	146.58	10.87	44.83
STAKE 297	2087247	749292.8	0.25	4.72	12.49	27.95	196.51	20.05	104.13



**Appendix E**  
**HPGe Data**

STAKE NUMBER	Easting	Northing	U-235	U-238	Am-241	95% UCL Predicted Am-241	95% UCL Predicted Pu-239/240	Best Fit Predicted Am-241	Best Fit Predicted Pu-239/240
STAKE 298	2087260	749323.2	0.19	3.48	9.82	25.02	178.05	16.71	82.57
STAKE 299	2087281	749298.1	0.27	4.85	7.67	22.69	163.46	14.03	65.24
STAKE 300	2087293	749328.9	0.19	3.46	8.65	23.75	170.10	15.25	73.15
STAKE 301	2087314	749301.7	0.21	4.05	10.98	26.29	186.03	18.16	91.93
STAKE 302	2087327	749332.5	0.18	3.40	7.38	22.38	161.52	13.67	62.91
STAKE 303	2087349	749307.9	0.22	3.98	8.01	23.06	165.77	14.46	68.00
STAKE 304	2087362	749336.4	0.21	3.49	3.90	18.63	138.35	9.31	34.76
STAKE 305	2087381	749310.8	0.22	4.04	5.42	20.26	148.38	11.21	47.03
STAKE 306	2086872	749301.8	0.27	5.14	5.60	20.45	149.55	11.43	48.45
STAKE 307	2086905	749304.6	0.23	4.47	8.01	23.05	165.73	14.45	67.95
STAKE 308	2086937	749310.8	0.27	5.10	18.75	34.95	241.21	27.89	154.76
STAKE 309	2086967	749312.8	0.25	4.54	15.30	31.08	216.36	23.57	126.88
STAKE 310	2087002	749320.5	0.27	5.01	19.03	35.27	243.23	28.24	156.99
STAKE 311	2087015	749350.6	0.23	4.20	6.46	21.37	155.29	12.51	55.40
STAKE 312	2087036	749322.7	0.26	4.83	20.44	36.87	253.55	30.00	168.37
STAKE 313	2087051	749353.6	0.22	4.15	19.41	35.70	246.00	28.71	160.06
STAKE 314	2087071	749326.9	0.25	4.77	19.00	35.23	243.00	28.20	156.74
STAKE 315	2087084	749359.6	0.24	4.09	19.56	35.87	247.09	28.90	161.26
STAKE 316	2087104	749331.5	0.26	4.90	19.53	35.84	246.90	28.86	161.06
STAKE 317	2087119	749362.2	0.23	4.13	16.55	32.48	225.31	25.14	137.00
STAKE 318	2087139	749336.6	0.26	4.81	15.30	31.08	216.37	23.58	126.90
STAKE 319	2087153	749366.3	0.22	4.11	14.43	30.10	210.14	22.48	119.80
STAKE 320	2087174	749341.5	0.26	4.75	15.43	31.22	217.27	23.73	127.91
STAKE 321	2087187	749369.9	0.22	4.04	13.34	28.90	202.50	21.12	111.04
STAKE 322	2087208	749343.6	0.25	4.59	11.17	26.50	187.34	18.40	93.47
STAKE 323	2087222	749374.9	0.22	4.00	12.84	28.34	198.97	20.49	106.98
STAKE 324	2087242	749348.2	0.26	4.86	9.63	24.81	176.74	16.47	81.02
STAKE 325	2087256	749380.6	0.22	4.06	10.55	25.82	183.09	17.63	88.50
STAKE 326	2087276	749351.4	0.26	4.78	7.89	22.92	164.92	14.30	66.98
STAKE 327	2087288	749384.1	0.18	3.36	10.36	25.61	181.74	17.39	86.92
STAKE 328	2087307	749360.4	0.22	4.25	9.45	24.62	175.55	16.26	79.62
STAKE 329	2087322	749387.5	0.09	3.34	7.04	22.00	159.17	13.23	60.09
STAKE 330	2087343	749364.8	0.22	4.15	7.36	22.35	161.35	13.64	62.70
STAKE 331	2087355	749392.3	0.14	3.43	7.78	22.81	164.21	14.17	66.13
STAKE 332	2087376	749368.1	0.22	4.17	8.77	23.88	170.91	15.40	74.12
STAKE 333	2087098	749391	0.26	4.71	10.31	25.56	181.46	17.33	86.58
STAKE 334	2087131	749394	0.23	4.27	20.21	36.61	251.87	29.71	166.53
STAKE 335	2087146	749423.8	0.22	4.08	12.78	28.27	198.56	20.42	106.50
STAKE 336	2087166	749396.2	0.27	5.13	24.85	41.93	286.53	35.52	204.02
STAKE 337	2087179	749431.4	0.22	3.95	2.82	17.48	131.28	7.96	26.01
STAKE 338	2087201	749403.7	0.23	5.43	24.42	41.43	283.26	34.98	200.53
STAKE 339	2087212	749434.2	0.22	4.07	13.64	29.23	204.59	21.49	113.45
STAKE 340	2087233	749410.4	0.20	5.80	19.40	35.69	245.93	28.70	159.98
STAKE 341	2087246	749439.8	0.24	4.28	8.37	23.44	168.18	14.90	70.86
STAKE 342	2087268	749414	0.27	4.93	13.36	28.92	202.63	21.14	111.19
STAKE 343	2087281	749443.4	0.19	3.51	8.92	24.04	171.94	15.59	75.34
STAKE 344	2087303	749419.4	0.28	5.14	7.29	22.28	160.92	13.56	62.18
STAKE 345	2087314	749449.1	0.18	3.67	8.87	23.99	171.57	15.53	74.90
STAKE 346	2087336	749422.1	0.23	4.22	8.01	23.05	165.73	14.45	67.94
STAKE 347	2087225	749466.9	0.21	3.96	5.97	20.85	152.05	11.90	51.49
STAKE 348	2087259	749473.4	0.19	3.70	8.39	23.46	168.28	14.92	70.99

**Appendix E**  
**HPGe Data**

STAKE NUMBER	Easting	Northing	U-235	U-238	Am-241	95% UCL Predicted Am-241	95% UCL Predicted Pu-239/240	Best Fit Predicted Am-241	Best Fit Predicted Pu-239/240
STAKE 349	2087294	749478.3	0.23	4.03	7.59	22.60	162.90	13.92	64.56
STAKE 350	2087303	749508.9	0.19	2.97	1.24	15.81	121.05	5.98	13.24
STAKE 351	2087328	749483.3	0.22	4.13	9.77	24.97	177.71	16.65	82.16
STAKE 352	2087339	749514.5	0.20	3.57	2.48	17.13	129.11	7.54	23.31
STAKE 353	2086620	749178.6	0.26	4.84	8.95	24.07	172.12	15.63	75.56
STAKE 354	2086658	749183.2	0.23	4.07	15.02	30.77	214.38	23.23	124.63
STAKE 355	2086645	749153.6	0.26	5.04	6.29	21.20	154.18	12.30	54.07
STAKE 356	2086678	749157.1	0.23	4.17	31.75	50.04	340.05	44.15	259.81
STAKE 357	2086692	749188	0.14	4.40	0.68	15.23	117.48	5.28	8.75
STAKE 358	2086712	749159.1	0.27	4.97	31.29	49.49	336.41	43.58	256.10
STAKE 359	2086726	749190.7	0.22	3.42	31.44	49.66	337.57	43.76	257.28
STAKE 360	2086747	749162.7	0.28	5.09	1.57	16.17	123.21	6.40	15.96
STAKE 361	2086760	749195.2	0.22	4.07	31.08	49.23	334.70	43.31	254.34
STAKE 362	2086780	749167.6	0.25	4.92	49.28	71.55	486.31	66.08	401.44
STAKE 363	2086793	749200.2	0.21	4.05	23.86	40.78	279.02	34.27	195.99
STAKE 364	2086816	749174.3	0.25	4.72	35.96	55.08	373.82	49.42	293.83
STAKE 365	2086829	749207.4	0.22	4.03	20.17	36.56	251.60	29.67	166.23
STAKE 366	2086850	749179.5	0.23	4.60	27.54	45.07	307.15	38.89	225.80
STAKE 367	2086863	749212.2	0.22	4.13	21.42	37.99	260.85	31.23	176.35
STAKE 368	2086884	749184.5	0.25	4.66	19.41	35.70	246.03	28.72	160.10
STAKE 369	2086896	749216.6	0.22	4.11	13.20	28.74	201.50	20.94	109.90
STAKE 370	2086917	749189	0.24	4.70	15.32	31.10	216.49	23.60	127.03
STAKE 371	2086929	749221.1	0.23	4.09	11.76	27.15	191.43	19.14	98.24
STAKE 372	2086951	749193.7	0.25	4.72	13.13	28.66	201.00	20.85	109.31
STAKE 373	2086964	749226	0.23	4.28	8.38	23.45	168.24	14.91	70.94
STAKE 374	2086984	749198.3	0.25	4.77	15.85	31.69	220.28	24.26	131.32
STAKE 375	2086996	749230.5	0.24	4.18	13.74	29.34	205.32	21.62	114.28
STAKE 376	2087017	749202.9	0.27	5.12	7.82	22.85	164.48	14.22	66.45
STAKE 377	2087032	749233.3	0.23	4.21	12.54	28.01	196.88	20.12	104.56
STAKE 378	2087052	749206.3	0.27	5.27	10.53	25.80	182.92	17.60	88.30
STAKE 379	2087066	749238.4	0.23	4.08	16.54	32.47	225.24	25.13	136.92
STAKE 380	2087086	749210.5	0.28	5.04	11.81	27.20	191.76	19.20	98.62
STAKE 381	2087100	749242.5	0.22	4.17	14.62	30.31	211.49	22.72	121.35
STAKE 382	2087120	749216.5	0.29	5.21	5.99	20.87	152.15	11.92	51.61
STAKE 383	2087133	749248.9	0.23	2.94	9.61	24.79	176.61	16.45	80.86
STAKE 384	2087152	749220.8	0.29	5.34	6.46	21.38	155.31	12.51	55.43
STAKE 385	2087166	749252.7	0.19	3.60	8.51	23.59	169.12	15.07	71.99
STAKE 386	2087187	749225.6	0.24	4.42	9.60	24.78	176.55	16.44	80.80
STAKE 387	2087201	749257.7	0.18	3.44	13.47	29.04	203.38	21.28	112.06
STAKE 388	2087221	749229.6	0.23	4.36	10.29	25.53	181.26	17.30	86.35
STAKE 389	2087235	749261.8	0.20	3.70	5.75	20.61	150.56	11.62	49.68
STAKE 390	2087255	749233.6	0.23	4.22	17.50	33.54	232.13	26.32	144.65
STAKE 391	2087268	749265.7	0.19	2.15	6.94	21.90	158.56	13.12	59.35
STAKE 392	2087288	749237.3	0.22	4.06	17.00	32.98	228.54	25.70	140.63
STAKE 393	2087300	749269.8	0.19	3.60	8.28	23.34	167.56	14.79	70.13
STAKE 394	2087321	749241.6	0.20	4.15	12.90	28.41	199.43	20.57	107.50
STAKE 395	2087335	749272.2	0.20	3.65	3.77	18.50	137.50	9.15	33.71
STAKE 396	2087356	749246.2	0.16	4.01	10.20	25.44	180.69	17.19	85.68
STAKE 397	2087369	749277.8	0.19	3.56	7.30	22.28	160.95	13.56	62.23
STAKE 398	2087390	749250.6	0.22	4.15	15.43	31.22	217.28	23.74	127.93
STAKE 399	2087401	749280.6	0.19	3.51	8.07	23.12	166.13	14.52	68.43

**Appendix E**  
**HPGe Data**

STAKE NUMBER	Easting	Northing	U-235	U-238	Am-241	95% UCL Predicted Am-241	95% UCL Predicted Pu-239/240	Best Fit Predicted Am-241	Best Fit Predicted Pu-239/240
STAKE 400	2087423	749254.9	0.21	4.08	10.92	26.23	185.66	18.10	91.51
STAKE 401	2087437	749285.8	0.19	3.43	2.88	17.54	131.65	8.03	26.47
STAKE 402	2087457	749257.3	0.22	4.22	6.80	21.75	157.62	12.94	58.22
STAKE 403	2087471	749289.9	0.19	3.55	5.63	20.49	149.81	11.48	48.77
STAKE 404	2087491	749261.5	0.22	3.98	9.02	24.15	172.62	15.72	76.15
STAKE 405	2086562	749113.5	0.23	4.30	29.51	47.38	322.38	41.34	241.66
STAKE 406	2086548	749086.1	0.25	4.99	70.17	98.96	680.13	92.22	570.25
STAKE 407	2086597	749120	0.23	4.16	3.78	18.51	137.56	9.16	33.78
STAKE 408	2086581	749087.8	0.27	5.07	65.77	93.02	637.55	86.71	534.69
STAKE 409	2086630	749120.7	0.23	4.34	39.73	59.66	404.76	54.13	324.27
STAKE 410	2086616	749089.4	0.27	5.07	47.85	69.74	473.80	64.29	389.87
STAKE 411	2086664	749123.5	0.23	4.28	44.24	65.22	442.69	59.77	360.68
STAKE 412	2086649	749095.5	0.26	4.95	47.33	69.08	469.25	63.64	385.64
STAKE 413	2086695	749127.2	0.22	4.12	33.97	52.68	357.72	46.93	277.73
STAKE 414	2086684	749098.3	0.25	4.85	41.91	62.34	422.97	56.86	341.87
STAKE 415	2086731	749133.6	0.22	4.14	27.15	44.61	304.12	38.40	222.62
STAKE 416	2086717	749102.1	0.26	4.74	17.73	33.80	233.80	26.61	146.51
STAKE 417	2086766	749134.9	0.22	4.23	15.42	31.21	217.22	23.72	127.86
STAKE 418	2086753	749103.9	0.27	4.88	11.23	26.56	187.74	18.47	93.94
STAKE 419	2086802	749139.7	0.21	3.90	6.79	21.73	157.53	12.93	58.11
STAKE 420	2086791	749108.2	0.31	5.45	1.43	16.02	122.30	6.22	14.81
STAKE 421	2086838	749146	0.17	3.10	7.44	22.43	161.89	13.74	63.35
STAKE 422	2086824	749116.6	0.27	4.75	1.21	15.78	120.88	5.95	13.03
STAKE 423	2086872	749152.5	0.20	3.52	4.42	19.19	141.78	9.96	38.97
STAKE 424	2086858	749122.1	0.26	4.76	1.15	15.72	120.47	5.87	12.51
STAKE 425	2086906	749156.8	0.20	3.55	4.22	18.98	140.48	9.72	37.37
STAKE 426	2086893	749127.1	0.15	4.83	1.23	15.80	121.01	5.97	13.19
STAKE 427	2086938	749161.4	0.22	3.84	0.86	15.41	118.60	5.50	10.17
STAKE 428	2086927	749132.3	0.26	4.44	1.17	15.74	120.60	5.89	12.68
STAKE 429	2086973	749165.6	0.24	4.13	0.91	15.47	118.97	5.57	10.63
STAKE 430	2086960	749137.2	0.22	4.01	6.95	21.90	158.59	13.12	59.39
STAKE 431	2087006	749171.2	0.11	3.85	1.95	16.57	125.66	6.87	19.02
STAKE 432	2086994	749143.3	0.21	4.05	42.57	63.15	428.51	57.68	347.18
STAKE 433	2087038	749179.6	0.22	3.93	6.55	21.47	155.92	12.62	56.16
STAKE 434	2087027	749142.3	0.22	4.32	25.83	43.08	294.02	36.75	211.97
STAKE 435	2087074	749181.4	0.18	3.56	11.37	26.72	188.73	18.65	95.09
STAKE 436	2087061	749149.3	0.13	4.28	25.10	42.22	288.42	35.83	206.02
STAKE 437	2087102	749193.9	0.21	3.92	15.71	31.53	219.28	24.09	130.19
STAKE 438	2087091	749164.2	0.27	4.87	22.62	39.37	269.78	32.73	186.04
STAKE 439	2087136	749190.9	0.22	4.10	11.50	26.86	189.62	18.81	96.13
STAKE 440	2087124	749171.5	0.26	4.83	19.81	36.16	248.96	29.22	163.33
STAKE 441	2087170	749205.5	0.16	4.12	9.03	24.16	172.67	15.73	76.21
STAKE 442	2087157	749176.1	0.28	5.23	22.81	39.58	271.19	32.97	187.56
STAKE 443	2087205	749213.6	0.24	4.22	3.39	18.09	135.00	8.67	30.61
STAKE 444	2087192	749183.3	0.29	5.47	18.35	34.49	238.25	27.38	151.47
STAKE 445	2087243	749200.4	0.25	4.56	1.06	15.62	119.91	5.76	11.81
STAKE 446	2087228	749169.9	0.29	5.44	16.24	32.13	223.08	24.75	134.48
STAKE 447	2087278	749202.7	0.26	4.60	1.03	15.59	119.70	5.72	11.55
STAKE 448	2087262	749169.2	0.27	5.40	12.95	28.46	199.73	20.63	107.85
STAKE 449	2087311	749209.3	0.12	4.42	3.23	17.92	133.93	8.47	29.30
STAKE 450	2087296	749180.1	0.25	4.64	12.95	28.47	199.78	20.64	107.91

265

**Appendix E**  
**HPGe Data**

STAKE NUMBER	Easting	Northing	U-235	U-238	Am-241	95% UCL Predicted Am-241	95% UCL Predicted Pu-239/240	Best Fit Predicted Am-241	Best Fit Predicted Pu-239/240
STAKE 451	2087344	749212.7	0.22	4.13	9.28	24.43	174.35	16.04	78.20
STAKE 452	2087331	749184.3	0.29	5.19	2.43	17.07	128.76	7.47	22.88
STAKE 453	2087378	749215.8	0.19	3.45	10.83	26.13	185.00	17.98	90.73
STAKE 454	2087362	749186.5	0.27	4.70	1.21	15.78	120.86	5.94	13.01
STAKE 455	2087408	749218.6	0.19	3.53	8.86	23.98	171.52	15.52	74.84
STAKE 456	2087385	749189.5	0.26	4.72	1.20	15.77	120.81	5.93	12.94
STAKE 457	2087435	749222.9	0.22	3.89	0.68	15.22	117.44	5.28	8.70
STAKE 458	2087420	749191.6	0.25	4.51	1.58	16.17	123.26	6.41	16.01
STAKE 459	2086537	749056	0.12	3.79	61.05	86.75	592.88	80.80	496.52
STAKE 460	2086554	749026.5	0.22	4.27	115.74	165.39	1176.47	149.22	938.42
STAKE 461	2086562	749057.5	0.22	4.20	91.85	129.42	903.63	119.33	745.36
STAKE 462	2086580	749028.8	0.25	4.83	109.04	155.05	1097.16	140.84	884.28
STAKE 463	2086597	749061.1	0.23	4.35	61.66	87.56	598.62	81.57	501.49
STAKE 464	2086616	749032.5	0.24	4.73	77.78	109.41	755.97	101.73	631.70
STAKE 465	2086628	749061.8	0.25	4.55	13.12	28.65	200.91	20.84	109.21
STAKE 466	2086646	749030.8	0.23	4.50	15.33	31.11	216.58	23.61	127.13
STAKE 467	2086671	749065	0.27	4.71	1.26	15.84	121.22	6.01	13.45
STAKE 468	2086691	749039.1	0.26	4.87	32.88	51.38	349.03	45.57	268.94
STAKE 469	2086703	749068.1	0.24	4.25	0.95	15.51	119.23	5.62	10.95
STAKE 470	2086724	749042.2	0.27	5.03	38.63	58.31	395.60	52.75	315.33
STAKE 471	2086738	749071.9	0.25	4.33	0.97	15.53	119.35	5.65	11.11
STAKE 472	2086758	749046.8	0.22	4.26	42.75	63.38	430.07	57.91	348.67
STAKE 473	2086770	749077.2	0.22	4.08	0.95	15.51	119.22	5.62	10.95
STAKE 474	2086792	749049.9	0.21	3.98	34.51	53.33	362.06	47.60	282.08
STAKE 475	2086803	749079.5	0.25	4.39	0.99	15.55	119.47	5.67	11.26
STAKE 476	2086824	749059.8	0.25	4.56	12.24	27.68	194.80	19.74	102.15
STAKE 477	2086835	749081.8	0.23	4.12	0.92	15.48	119.03	5.59	10.70
STAKE 478	2087214	749139.4	0.11	4.17	15.75	31.58	219.55	24.13	130.49
STAKE 479	2087348	749158.6	0.18	3.45	11.51	26.88	189.74	18.83	96.27
STAKE 480	2087373	749135.7	0.20	3.82	10.14	25.37	180.24	17.11	85.15
STAKE 481	2087316	749152.1	0.19	3.59	10.16	25.39	180.37	17.14	85.30
STAKE 482	2087331	749131.3	0.21	3.85	10.61	25.88	183.47	17.70	88.94
STAKE 483	2087282	749148.6	0.20	3.77	12.38	27.83	195.77	19.92	103.28
STAKE 484	2087292	749125.9	0.21	4.02	9.34	24.50	174.80	16.12	78.73
STAKE 485	2087249	749144.1	0.25	4.04	9.96	25.18	179.03	16.89	83.72
STAKE 486	2087268	749118.2	0.22	4.07	12.08	27.50	193.66	19.54	100.83
STAKE 487	2087235	749113.3	0.25	4.55	7.74	22.76	163.92	14.11	65.79
STAKE 488	2087183	749137.4	0.24	4.64	16.43	32.34	224.45	24.99	136.03
STAKE 489	2087202	749109.2	0.20	3.80	13.81	29.41	205.78	21.70	114.81
STAKE 490	2087150	749134.6	0.23	4.36	13.88	29.49	206.26	21.79	115.36
STAKE 491	2087170	749106.5	0.26	4.91	14.02	29.65	207.29	21.97	116.54
STAKE 492	2087117	749128.7	0.27	5.13	22.57	39.31	269.39	32.67	185.61
STAKE 493	2087136	749103.8	0.22	4.26	13.09	28.61	200.70	20.80	108.97
STAKE 494	2087086	749122.4	0.27	5.03	17.21	33.21	230.00	25.96	142.26
STAKE 495	2087106	749102.8	0.29	5.40	18.17	34.29	236.95	27.16	150.02
STAKE 496	2087043	749116.5	0.25	4.79	19.38	35.66	245.76	28.67	159.80
STAKE 497	2087063	749091.9	0.23	4.44	12.43	27.89	196.11	19.98	103.67
STAKE 498	2087014	749118.2	0.27	4.69	14.10	29.74	207.82	22.07	117.15
STAKE 499	2087036	749090.8	0.30	5.67	30.57	48.63	330.71	42.67	250.25
STAKE 500	2087571	749409.4	0.09	3.52	0.81	15.36	118.31	5.45	9.80
STAKE 501	2087553	749380.9	0.22	4.09	0.72	15.26	117.72	5.33	9.05

266

**Appendix E**  
**HPGe Data**

STAKE NUMBER	Easting	Northing	U-235	U-238	Am-241	95% UCL Predicted Am-241	95% UCL Predicted Pu-239/240	Best Fit Predicted Am-241	Best Fit Predicted Pu-239/240
STAKE 502	2087525	749498.3	0.20	3.65	0.86	15.41	118.62	5.51	10.19
STAKE 503	2087537	749469	0.21	3.96	1.55	16.14	123.07	6.37	15.78
STAKE 504	2087555	749497.9	0.19	3.46	0.79	15.34	118.17	5.42	9.62
STAKE 505	2087573	749469.7	0.21	3.95	1.09	15.65	120.08	5.79	12.02
STAKE 506	2087591	749500.3	0.23	4.21	7.14	22.12	159.91	13.37	60.97
STAKE 507	2087608	749469.1	0.20	3.79	6.03	20.92	152.45	11.98	51.98
STAKE 508	2087625	749497.9	0.13	3.69	5.46	20.30	148.65	11.26	47.36
STAKE 509	2087640	749469.1	0.22	3.97	4.82	19.62	144.43	10.46	42.20
STAKE 510	2087659	749498.4	0.19	3.63	5.60	20.45	149.55	11.43	48.45
STAKE 511	2087674	749467.3	0.21	4.00	5.18	20.00	146.77	10.91	45.07
STAKE 512	2087692	749496	0.19	3.57	5.18	20.00	146.76	10.90	45.06
STAKE 513	2087709	749467.6	0.21	3.89	6.02	20.91	152.39	11.96	51.90
STAKE 514	2087725	749494.4	0.20	3.63	4.58	19.36	142.84	10.16	40.26
STAKE 515	2087742	749467.8	0.21	3.84	4.71	19.50	143.70	10.32	41.31
STAKE 516	2087785	749330.5	0.21	3.83	4.24	19.00	140.60	9.74	37.52
STAKE 517	2087606	749535.1	0.18	3.29	3.04	17.72	132.76	8.24	27.84
STAKE 518	2087644	749529.1	0.14	3.94	5.59	20.45	149.54	11.43	48.43
STAKE 519	2086484	748886.6	0.23	4.12	35.32	54.30	368.57	48.61	288.60
STAKE 520	2086492	748850.9	0.27	4.93	4.07	18.81	139.44	9.52	36.09
STAKE 521	2086513	748881.4	0.22	4.12	33.75	52.42	355.98	46.66	275.97
STAKE 522	2086523	748850.7	0.38	5.57	3.67	18.38	136.82	9.02	32.87
STAKE 523	2086546	748874.4	0.12	4.08	36.33	55.53	376.83	49.88	296.82
STAKE 524	2086548	748846.1	0.27	5.04	7.08	22.04	159.45	13.28	60.42
STAKE 525	2086575	748876.2	0.21	3.87	27.80	45.37	309.11	39.21	227.86
STAKE 526	2086582	748844.4	0.30	5.48	4.67	19.45	143.40	10.27	40.95
STAKE 527	2086608	748872.6	0.21	3.96	28.09	45.71	311.34	39.57	230.18
STAKE 528	2086624	748840.2	0.29	5.46	4.07	18.81	139.47	9.52	36.12
STAKE 529	2086638	748872.1	0.20	3.76	13.27	28.82	202.01	21.03	110.48
STAKE 530	2086660	748840.9	0.15	5.50	4.90	19.70	144.95	10.56	42.84
STAKE 531	2086681	748863.6	0.21	3.98	16.22	32.10	222.89	24.72	134.27
STAKE 532	2086694	748833.7	0.30	5.54	3.25	17.94	134.11	8.50	29.52
STAKE 533	2086716	748861.1	0.23	4.28	18.09	34.21	236.42	27.06	149.43
STAKE 534	2086730	748827.7	0.28	5.13	8.26	23.32	167.42	14.76	69.96
STAKE 535	2086749	748856.6	0.24	4.32	24.78	41.86	286.02	35.43	203.47
STAKE 536	2086762	748824.9	0.27	5.00	10.45	25.71	182.39	17.50	87.68
STAKE 537	2086780	748853.8	0.24	4.37	17.28	33.29	230.54	26.05	142.87
STAKE 538	2086793	748821.5	0.28	5.25	12.65	28.13	197.62	20.25	105.41
STAKE 539	2086813	748849.3	0.30	4.33	8.07	23.12	166.14	14.52	68.43
STAKE 540	2086826	748820.9	0.27	5.07	1.35	15.93	121.76	6.12	14.13
STAKE 541	2086845	748847.9	0.23	4.23	1.53	16.12	122.92	6.34	15.59
STAKE 542	2086858	748815.2	0.27	5.00	4.56	19.34	142.71	10.14	40.10
STAKE 543	2086888	748810.8	0.27	4.95	4.43	19.20	141.86	9.98	39.06
STAKE 544	2086871	748782.8	0.14	4.16	0.82	15.37	118.39	5.46	9.90
STAKE 545	2086904	748781.6	0.25	4.40	8.31	23.38	167.76	14.82	70.37
STAKE 546	2086495	748913.1	0.13	4.15	59.84	85.16	581.58	79.29	486.72
STAKE 547	2086531	748906.1	0.20	3.79	61.45	87.27	596.59	81.30	499.73
STAKE 548	2086566	748907.1	0.21	4.12	19.70	36.03	248.14	29.08	162.42
STAKE 549	2086599	748897.3	0.22	3.99	27.82	45.39	309.26	39.23	228.01
STAKE 550	2086633	748903.4	0.26	4.79	25.40	42.58	290.74	36.21	208.49
STAKE 551	2086656	748894.3	0.22	3.95	18.00	34.10	235.74	26.95	148.68
STAKE 552	2086697	748886.4	0.24	4.73	18.58	34.76	239.95	27.67	153.36

**Appendix E**  
**HPGe Data**

STAKE NUMBER	Easting	Northing	U-235	U-238	Am-241	95% UCL Predicted Am-241	95% UCL Predicted Pu-239/240	Best Fit Predicted Am-241	Best Fit Predicted Pu-239/240
STAKE 553	2086731	748883.1	0.22	4.03	20.62	37.08	254.91	30.23	169.86
STAKE 554	2086766	748879.4	0.25	4.58	18.69	34.89	240.78	27.82	154.29
STAKE 555	2086799	748875.6	0.22	4.15	19.68	36.00	247.98	29.05	162.25
STAKE 556	2086832	748875.4	0.25	4.71	16.28	32.17	223.33	24.79	134.77
STAKE 557	2086850	748903.1	0.22	4.02	15.10	30.85	214.90	23.32	125.22
STAKE 558	2086881	748903	0.23	4.23	11.86	27.26	192.13	19.26	99.05
STAKE 559	2086904	748926.7	0.24	4.55	20.88	37.37	256.81	30.55	171.93
STAKE 560	2086870	748933.5	0.28	5.21	16.27	32.15	223.24	24.78	134.67
STAKE 561	2086835	748934.5	0.26	4.82	17.36	33.38	231.10	26.15	143.50
STAKE 562	2086804	748943.3	0.27	5.27	14.25	29.90	208.88	22.25	118.36
STAKE 563	2086813	748908.1	0.26	4.79	18.87	35.09	242.10	28.04	155.74
STAKE 564	2086768	748939.4	0.29	5.37	21.02	37.54	257.89	30.73	173.11
STAKE 565	2086782	748911.7	0.27	5.04	23.27	40.11	274.59	33.54	191.23
STAKE 566	2086737	748938.5	0.28	5.36	23.80	40.72	278.60	34.20	195.54
STAKE 567	2086750	748912	0.27	5.16	23.34	40.19	275.15	33.63	191.83
STAKE 568	2086705	748938.1	0.29	5.46	23.11	39.92	273.40	33.34	189.94
STAKE 569	2086716	748910.6	0.29	5.30	28.35	46.01	313.36	39.89	232.28
STAKE 570	2086673	748949.5	0.25	4.77	25.76	42.99	293.49	36.66	211.41
STAKE 571	2086681	748918.6	0.33	4.81	23.97	40.92	279.89	34.42	196.92
STAKE 572	2086646	748953.2	0.28	5.25	28.65	46.36	315.67	40.27	234.69
STAKE 573	2086662	748926.5	0.29	5.50	30.06	48.02	326.67	42.03	246.08
STAKE 574	2086621	748938.8	0.30	5.66	37.24	56.63	384.23	51.02	304.15
STAKE 575	2086595	748927.8	0.27	5.19	36.39	55.60	377.31	49.96	297.30
STAKE 576	2086569	748943.9	0.24	4.34	23.22	40.05	274.25	33.48	190.87
STAKE 577	2086540	748927.1	0.25	4.66	39.60	59.49	403.63	53.96	323.17
STAKE 578	2086522	748932.1	0.25	4.70	31.53	49.77	338.29	43.88	258.02
STAKE 579	2086486	748943	0.25	4.49	4.03	18.77	139.19	9.47	35.79
STAKE 580	2086512	748967.8	0.21	4.00	42.86	63.51	431.00	58.05	349.56
STAKE 581	2086542	748960	0.23	4.25	21.93	38.57	264.57	31.86	180.39
STAKE 582	2086534	748992.6	0.22	4.40	77.20	108.60	750.10	101.01	627.02
STAKE 583	2086568	748981.4	0.23	4.32	34.13	52.87	358.99	47.12	278.99
STAKE 584	2086602	748986.4	0.22	4.14	40.94	61.14	414.85	55.65	334.04
STAKE 585	2086592	748960.7	0.25	4.48	28.01	45.62	310.76	39.47	229.58
STAKE 586	2086624	748960.2	0.25	4.60	19.58	35.89	247.26	28.93	161.45
STAKE 587	2086642	749006.2	0.24	3.77	34.06	52.79	358.42	47.04	278.42
STAKE 588	2086660	748983.7	0.24	4.45	19.23	35.49	244.66	28.48	158.58
STAKE 589	2086678	749008.8	0.22	4.22	12.43	27.89	196.14	19.99	103.71
STAKE 590	2086712	749014.9	0.22	4.09	16.32	32.21	223.60	24.84	135.07
STAKE 591	2086744	749017	0.24	4.41	17.74	33.82	233.89	26.63	146.61
STAKE 592	2086775	749021.6	0.28	5.48	20.67	37.13	255.26	30.29	170.24
STAKE 593	2086806	749023.9	0.13	4.59	14.27	29.92	209.00	22.28	118.50
STAKE 594	2086935	749073.9	0.23	4.34	10.38	25.64	181.92	17.42	87.13
STAKE 595	2086950	749105	0.24	4.49	35.42	54.42	369.37	48.74	289.40
STAKE 596	2086969	749079.8	0.26	4.95	31.22	49.40	335.80	43.48	255.47
STAKE 597	2086957	749050.8	0.23	4.16	24.79	41.87	286.11	35.45	203.57
STAKE 598	2086993	749057.6	0.20	3.77	20.43	36.86	253.52	29.99	168.34
STAKE 599	2087025	749060.4	0.28	5.32	27.98	45.58	310.52	39.43	229.33
STAKE 600	2087058	749064.8	0.24	4.39	20.59	37.04	254.66	30.18	169.58
STAKE 601	2087093	749067.1	0.25	4.67	19.32	35.59	245.32	28.59	159.31
STAKE 602	2087121	749069.6	0.24	4.43	18.26	34.40	237.65	27.28	150.81
STAKE 603	2087157	749072.4	0.27	5.22	15.02	30.76	214.37	23.22	124.63

**Appendix E**  
**HPGe Data**

STAKE NUMBER	Easting	Northing	U-235	U-238	Am-241	95% UCL Predicted Am-241	95% UCL Predicted Pu-239/240	Best Fit Predicted Am-241	Best Fit Predicted Pu-239/240
STAKE 604	2087141	749046	0.25	4.66	22.76	39.53	270.81	32.90	187.15
STAKE 605	2087080	749040.8	0.26	5.09	24.04	41.00	280.45	34.51	197.52
STAKE 606	2087119	749044.4	0.26	4.94	27.23	44.70	304.70	38.49	223.23
STAKE 607	2087046	749035.9	0.31	5.74	29.35	47.20	321.18	41.15	240.41
STAKE 608	2087015	749031.6	0.29	5.54	20.73	37.20	255.74	30.37	170.76
STAKE 609	2086978	749028.2	0.26	4.74	22.66	39.41	270.05	32.78	186.33
STAKE 610	2086946	749026	0.29	5.44	32.61	51.06	346.88	45.23	266.76
STAKE 611	2086967	748998.3	0.22	3.99	17.04	33.02	228.80	25.75	140.92
STAKE 612	2087003	749001.8	0.18	6.13	35.81	54.89	372.53	49.22	292.54
STAKE 613	2087035	749005.3	0.25	4.59	21.72	38.33	263.01	31.60	178.70
STAKE 614	2087057	749008.5	0.29	5.48	25.51	42.70	291.54	36.34	209.34
STAKE 615	2087058	749007.3	0.27	4.86	19.63	35.95	247.65	28.99	161.88
STAKE 616	2087019	748975.7	0.31	5.73	15.65	31.47	218.85	24.01	129.71
STAKE 617	2086921	748956.8	0.16	5.00	29.53	47.40	322.55	41.37	241.83
STAKE 618	2086956	748962.6	0.29	5.38	21.58	38.17	261.97	31.42	177.57
STAKE 619	2087095	749014.8	0.25	4.65	21.42	37.98	260.80	31.22	176.29
STAKE 620	2086708	748990.8	0.24	4.48	17.98	34.09	235.63	26.93	148.55
STAKE 621	2086735	748991.8	0.22	4.01	14.97	30.70	213.98	23.15	124.17
STAKE 622	2086763	748992.1	0.23	4.49	17.94	34.04	235.34	26.88	148.23
STAKE 623	2086801	748993.8	0.25	4.54	16.72	32.67	226.52	25.35	138.35
STAKE 624	2086834	748997.5	0.29	5.45	21.00	37.50	257.68	30.70	172.89
STAKE 625	2086980	749107.3	0.25	4.71	19.08	35.32	243.56	28.29	157.37
STAKE 626	2087001	749084.9	0.23	4.19	18.28	34.42	237.80	27.30	150.97
STAKE 627	2086012	748785.6	0.27	5.03	7.01	21.97	159.00	13.20	59.88
STAKE 628	2085996	748755.7	0.24	4.56	5.79	20.66	150.84	11.67	50.02
STAKE 629	2085980	748784.9	0.30	5.47	9.12	24.26	173.30	15.84	76.96
STAKE 630	2085962	748757.3	0.27	4.86	11.52	26.88	189.76	18.84	96.29
STAKE 631	2085949	748778.1	0.26	4.81	21.68	38.28	262.71	31.55	178.37
STAKE 632	2085932	748755.7	0.30	4.33	5.05	19.86	145.93	10.75	44.04
STAKE 633	2085899	748693.8	0.29	5.42	7.84	22.86	164.57	14.23	66.56
STAKE 634	2085914	748722	0.25	4.66	2.66	17.32	130.25	7.76	24.74
STAKE 635	2085928	748692.4	0.23	4.39	34.27	53.04	360.09	47.30	280.11
STAKE 636	2085945	748721.6	0.20	3.79	4.49	19.27	142.26	10.05	39.56
STAKE 637	2085962	748698.5	0.25	4.70	3.45	18.15	135.39	8.74	31.10
STAKE 638	2085974	748723.2	0.20	3.83	2.89	17.56	131.78	8.05	26.63
STAKE 639	2085995	748691.5	0.29	4.91	2.05	16.67	126.31	7.00	19.83
STAKE 640	2086015	748722	0.22	4.07	16.81	32.76	227.14	25.46	139.06
STAKE 641	2086028	748693.2	0.26	4.89	42.92	63.59	431.53	58.13	350.07
STAKE 642	2086045	748720.2	0.23	4.20	64.75	91.65	627.76	85.43	526.41
STAKE 643	2086062	748694.7	0.27	4.97	96.08	135.61	949.95	124.63	779.57
STAKE 644	2086079	748721.4	0.23	4.31	75.34	106.03	731.35	98.68	612.00
STAKE 645	2086095	748690.6	0.34	6.06	7.89	22.92	164.94	14.30	67.00
STAKE 646	2086112	748718	0.29	5.15	4.20	18.95	140.30	9.68	37.15
STAKE 647	2086130	748692.1	0.28	5.20	30.45	48.49	329.77	42.52	249.28
STAKE 648	2086145	748719.6	0.26	4.69	1.25	15.82	121.12	5.99	13.33
STAKE 649	2086157	748694.5	0.29	5.25	18.37	34.52	238.45	27.42	151.69
STAKE 650	2086172	748723.2	0.27	4.74	0.81	15.36	118.30	5.44	9.79
STAKE 651	2086189	748693.3	0.24	4.32	45.43	66.70	452.87	61.26	370.30
STAKE 652	2086205	748719.6	0.27	5.08	58.75	83.74	571.56	77.93	477.97
STAKE 653	2086229	748690.8	0.25	4.71	33.21	51.77	351.63	45.98	271.58
STAKE 654	2086245	748718.7	0.29	5.60	48.41	70.45	478.70	65.00	394.42

**Appendix E**  
**HPGe Data**

STAKE NUMBER	Easting	Northing	U-235	U-238	Am-241	95% UCL Predicted Am-241	95% UCL Predicted Pu-239/240	Best Fit Predicted Am-241	Best Fit Predicted Pu-239/240
STAKE 655	2086213	748661.4	0.26	4.98	27.35	44.84	305.64	38.64	224.21
STAKE 656	2086179	748662.3	0.25	4.51	27.97	45.57	310.41	39.42	229.21
STAKE 657	2086148	748663.5	0.29	5.49	45.58	66.89	454.15	61.45	371.51
STAKE 658	2086133	748634.6	0.28	5.09	22.83	39.61	271.35	32.99	187.73
STAKE 659	2086120	748663.3	0.32	5.96	48.24	70.23	477.18	64.78	393.01
STAKE 660	2086103	748634.9	0.27	4.94	20.40	36.82	253.27	29.95	168.06
STAKE 661	2086083	748663.6	0.13	5.54	39.75	59.69	404.95	54.16	324.45
STAKE 662	2086060	748634.2	0.27	4.90	47.74	69.60	472.81	64.15	388.95
STAKE 663	2086044	748662.5	0.31	5.75	19.18	35.43	244.30	28.42	158.18
STAKE 664	2086028	748635.4	0.22	4.13	4.06	18.81	139.41	9.51	36.05
STAKE 665	2086014	748662.6	0.23	4.40	4.51	19.28	142.35	10.07	39.66
STAKE 666	2085992	748633.6	0.22	4.02	2.52	17.17	129.35	7.59	23.62
STAKE 667	2085978	748666.6	0.25	4.67	2.09	16.71	126.55	7.05	20.13
STAKE 668	2085961	748634.8	0.13	4.40	18.86	35.07	241.96	28.02	155.59
STAKE 669	2085947	748667.5	0.23	4.27	35.31	54.29	368.53	48.61	288.56
STAKE 670	2085932	748639.7	0.24	4.47	14.18	29.83	208.43	22.17	117.85
STAKE 671	2085917	748667.3	0.23	4.25	17.63	33.69	233.08	26.49	145.71
STAKE 672	2085893	748639.7	0.21	4.00	0.56	15.10	116.71	5.13	7.78
STAKE 673	2085883	748672.2	0.22	4.11	2.22	16.85	127.42	7.21	21.21
STAKE 674	2085866	748643.5	0.11	4.69	1.90	16.51	125.35	6.81	18.63
STAKE 675	2085848	748670.3	0.22	4.18	1.56	16.15	123.13	6.38	15.86
STAKE 676	2085828	748649.9	0.17	4.31	2.40	17.04	128.57	7.43	22.64
STAKE 677	2085846	748620.3	0.26	4.86	1.06	15.63	119.93	5.76	11.83
STAKE 678	2085831	748589.2	0.26	4.71	1.23	15.80	121.01	5.97	13.19
STAKE 679	2085876	748610.2	0.20	3.84	0.92	15.47	118.98	5.58	10.64
STAKE 680	2085863	748583	0.22	4.22	1.93	16.54	125.51	6.84	18.84
STAKE 681	2085913	748612.5	0.23	4.15	7.78	22.80	164.17	14.16	66.08
STAKE 682	2085893	748583.9	0.25	4.67	5.39	20.23	148.18	11.17	46.78
STAKE 683	2085942	748608.4	0.23	4.14	16.34	32.24	223.77	24.87	135.27
STAKE 684	2085925	748579.4	0.24	4.48	12.03	27.44	193.29	19.47	100.40
STAKE 685	2085975	748605.6	0.21	4.03	9.66	24.85	177.00	16.52	81.33
STAKE 686	2085958	748576.6	0.22	4.12	7.23	22.21	160.46	13.47	61.64
STAKE 687	2086008	748604.7	0.24	4.37	2.25	16.88	127.61	7.25	21.44
STAKE 688	2085995	748575.4	0.12	4.56	7.31	22.29	160.99	13.57	62.27
STAKE 689	2086042	748602.8	0.21	3.85	17.64	33.69	233.11	26.49	145.74
STAKE 690	2086023	748571.5	0.24	4.55	9.53	24.71	176.08	16.35	80.24
STAKE 691	2086080	748603.2	0.22	4.13	16.31	32.20	223.53	24.83	134.99
STAKE 692	2086062	748573.3	0.22	4.33	44.41	65.43	444.15	59.99	362.06
STAKE 693	2086105	748601.9	0.31	5.27	20.94	37.44	257.27	30.63	172.44
STAKE 694	2086087	748575.2	0.27	5.06	12.88	28.38	199.25	20.54	107.29
STAKE 695	2086010	748542.4	0.21	3.88	10.58	25.85	183.27	17.66	88.71
STAKE 696	2086045	748547	0.24	4.51	16.39	32.29	224.13	24.93	135.66
STAKE 697	2085977	748547.9	0.20	3.81	8.83	23.95	171.32	15.48	74.60
STAKE 698	2085956	748516.6	0.25	4.63	7.64	22.65	163.26	13.99	64.99
STAKE 699	2085943	748546.3	0.22	4.04	7.66	22.67	163.35	14.01	65.10
STAKE 700	2085924	748520.7	0.26	4.82	7.22	22.20	160.42	13.46	61.58
STAKE 701	2085915	748549.3	0.23	4.12	5.71	20.57	150.32	11.58	49.39
STAKE 702	2085894	748525.3	0.25	4.67	8.84	23.95	171.37	15.49	74.67
STAKE 703	2085883	748551.4	0.13	3.93	8.50	23.59	169.09	15.07	71.96
STAKE 704	2085863	748524	0.24	4.60	8.34	23.41	167.95	14.86	70.59
STAKE 705	2085850	748554.4	0.19	3.56	8.03	23.08	165.90	14.48	68.15



**Appendix E**  
**HPGe Data**

STAKE NUMBER	Easting	Northing	U-235	U-238	Am-241	95% UCL Predicted Am-241	95% UCL Predicted Pu-239/240	Best Fit Predicted Am-241	Best Fit Predicted Pu-239/240
STAKE 706	2085828	748528.9	0.25	4.64	7.13	22.10	159.83	13.35	60.88
STAKE 707	2085817	748560	0.22	4.16	0.98	15.54	119.42	5.66	11.19
STAKE 708	2085793	748532.1	0.24	4.67	5.90	20.78	151.60	11.82	50.94
STAKE 709	2085782	748563.6	0.22	4.02	2.76	17.43	130.93	7.89	25.57
STAKE 710	2085763	748534.9	0.26	4.91	3.41	18.11	135.16	8.70	30.81
STAKE 711	2085776	748505.7	0.21	3.84	2.90	17.57	131.81	8.06	26.67
STAKE 712	2085756	748478.2	0.21	5.13	2.15	16.77	126.91	7.12	20.58
STAKE 713	2085809	748500.6	0.21	3.82	3.75	18.47	137.34	9.12	33.51
STAKE 714	2085792	748472.8	0.25	4.88	3.19	17.87	133.68	8.42	28.98
STAKE 715	2085844	748500.4	0.22	3.80	5.51	20.36	149.01	11.33	47.80
STAKE 716	2085823	748469.7	0.25	4.84	3.49	18.19	135.63	8.79	31.40
STAKE 717	2085876	748493.3	0.22	4.08	6.00	20.88	152.26	11.94	51.74
STAKE 718	2085854	748466.6	0.25	4.74	4.45	19.22	141.99	10.00	39.22
STAKE 719	2085803	748446.6	0.25	4.69	2.31	16.94	127.96	7.32	21.89
STAKE 720	2085767	748447.7	0.22	4.02	1.12	15.69	120.29	5.83	12.29
STAKE 721	2085740	748447.4	0.25	4.71	1.79	16.39	124.59	6.67	17.68
STAKE 722	2085752	748421.9	0.21	3.91	1.55	16.14	123.08	6.37	15.79
STAKE 723	2085707	748453.2	0.23	4.48	1.36	15.94	121.83	6.13	14.22
STAKE 724	2085718	748426	0.16	4.31	1.68	16.28	123.93	6.54	16.85
STAKE 725	2086043	748778.4	0.22	4.13	9.74	24.93	177.50	16.61	81.92
STAKE 726	2086026	748753.5	0.26	4.91	11.25	26.59	187.91	18.50	94.13
STAKE 727	2086076	748777.2	0.25	4.64	15.25	31.02	216.01	23.51	126.48
STAKE 728	2086059	748750.7	0.29	5.43	17.09	33.07	229.14	25.80	141.29
STAKE 729	2086111	748777.8	0.26	4.70	39.42	59.27	402.15	53.74	321.72
STAKE 730	2086093	748749.4	0.30	5.46	25.38	42.54	290.53	36.17	208.27
STAKE 731	2086135	748779.4	0.26	4.93	21.06	37.57	258.12	30.77	173.36
STAKE 732	2086126	748767	0.34	6.28	4.92	19.72	145.07	10.58	42.99
STAKE 733	2086179	748774.9	0.26	4.82	13.48	29.04	203.43	21.29	112.12
STAKE 734	2086159	748749.2	0.35	6.31	10.36	25.62	181.80	17.40	86.98
STAKE 735	2086215	748770.3	0.26	4.84	65.14	92.17	631.48	85.92	529.56
STAKE 736	2086197	748746.4	0.36	6.49	4.85	19.65	144.59	10.49	42.41
STAKE 737	2086246	748776	0.23	4.53	17.65	33.71	233.19	26.51	145.84
STAKE 738	2086228	748742.4	0.30	5.66	47.87	69.76	473.94	64.31	390.00
STAKE 739	2086279	748770.9	0.25	4.57	20.87	37.36	256.76	30.54	171.88
STAKE 740	2086264	748747.3	0.16	5.87	61.45	87.27	596.59	81.30	499.73
STAKE 741	2086316	748776.4	0.27	4.97	15.58	31.38	218.30	23.91	129.09
STAKE 742	2086296	748748.2	0.30	5.53	23.76	40.67	278.30	34.15	195.21
STAKE 743	2086329	748801.6	0.25	4.65	27.06	44.51	303.43	38.28	221.90
STAKE 744	2086344	748826.8	0.27	5.15	45.79	67.16	455.99	61.72	373.24
STAKE 745	2086298	748803	0.18	4.62	41.88	62.30	422.72	56.82	341.63
STAKE 746	2086317	748831.6	0.13	5.10	45.10	66.30	450.08	60.85	367.67
STAKE 747	2086264	748802.5	0.23	4.57	32.81	51.29	348.42	45.47	268.32
STAKE 748	2086286	748835.3	0.27	5.15	65.40	92.52	633.96	86.24	531.66
STAKE 749	2086830	748714.6	0.23	4.26	9.85	25.06	178.30	16.76	82.86
STAKE 750	2086847	748687.2	0.26	4.94	15.39	31.17	216.97	23.68	127.58
STAKE 751	2086872	748715.8	0.22	3.95	6.82	21.77	157.74	12.97	58.37
STAKE 752	2086881	748680.1	0.25	4.79	14.54	30.22	210.93	22.62	120.70
STAKE 753	2086912	748674.8	0.26	4.92	12.98	28.50	199.97	20.67	108.13
STAKE 754	2086948	748667.2	0.11	4.04	4.95	19.76	145.27	10.62	43.24
STAKE 755	2086893	748652.5	0.15	4.74	11.11	26.43	186.93	18.33	92.99
STAKE 756	2086928	748645.5	0.22	3.99	5.80	20.67	150.91	11.69	50.11

**Appendix E**  
**HPGe Data**

STAKE NUMBER	Easting	Northing	U-235	U-238	Am-241	95% UCL Predicted Am-241	95% UCL Predicted Pu-239/240	Best Fit Predicted Am-241	Best Fit Predicted Pu-239/240
STAKE 757	2086980	748664.2	0.24	4.27	1.02	15.58	119.64	5.70	11.47
STAKE 758	2086961	748641.3	0.11	4.71	6.80	21.75	157.62	12.94	58.22
STAKE 759	2086907	748618.8	0.21	3.94	7.64	22.65	163.21	13.98	64.94
STAKE 760	2086871	748622.8	0.24	4.58	8.90	24.02	171.76	15.56	75.13
STAKE 761	2086780	748609.3	0.22	4.04	13.17	28.71	201.31	20.91	109.68
STAKE 762	2086819	748602.9	0.26	4.72	10.90	26.20	185.49	18.07	91.31
STAKE 763	2086851	748597.4	0.23	4.16	8.87	23.98	171.55	15.52	74.88
STAKE 764	2086882	748593.5	0.25	4.89	8.99	24.12	172.41	15.68	75.90
STAKE 765	2086760	748581.8	0.22	4.04	11.14	26.47	187.14	18.36	93.24
STAKE 766	2086794	748576.1	0.27	4.65	12.43	27.88	196.09	19.98	103.65
STAKE 767	2086827	748569.4	0.17	4.63	11.33	26.68	188.47	18.60	94.79
STAKE 768	2086862	748563.2	0.20	3.79	5.44	20.28	148.54	11.24	47.22
STAKE 769	2086895	748558.5	0.25	4.84	8.11	23.16	166.40	14.57	68.75
STAKE 770	2086927	748550.6	0.21	3.84	5.35	20.19	147.94	11.13	46.49
STAKE 771	2087045	748892.7	0.24	4.24	7.50	22.50	162.27	13.81	63.81
STAKE 772	2087049	748928	0.25	4.41	3.26	17.95	134.13	8.50	29.55
STAKE 773	2087080	748904.4	0.22	3.95	5.35	20.19	147.95	11.13	46.50
STAKE 774	2087092	748926.9	0.26	4.77	9.20	24.34	173.81	15.94	77.56
STAKE 775	2087066	748956.7	0.22	3.94	9.37	24.53	174.95	16.15	78.91
STAKE 776	2087099	748961.1	0.07	1.31	0.38	14.91	115.55	4.91	6.32
STAKE 777	2087076	748988.3	0.22	3.99	10.80	26.09	184.80	17.94	90.50
STAKE 778	2087108	748992.9	0.24	4.40	17.21	33.21	230.02	25.96	142.29
STAKE 779	2087144	748996.9	0.22	4.10	3.92	18.65	138.45	9.33	34.87
STAKE 780	2087178	749001.4	0.14	4.31	3.50	18.20	135.70	8.80	31.48
STAKE 781	2087132	749022.5	0.21	3.82	19.30	35.57	245.21	28.57	159.18
STAKE 782	2087165	749026	0.24	4.40	1.32	15.89	121.55	6.08	13.87
STAKE 783	2087198	749029	0.19	4.11	4.45	19.22	141.98	10.00	39.21
STAKE 784	2087176	749055	0.23	4.33	4.75	19.54	143.94	10.37	41.61
STAKE 785	2087189	749066.9	0.21	3.76	8.52	23.61	169.23	15.09	72.12
STAKE 786	2087208	749053	0.24	4.42	23.06	39.87	273.06	33.28	189.58
STAKE 787	2087218	749070.6	0.20	3.75	11.80	27.19	191.73	19.19	98.58
STAKE 788	2087241	749055	0.22	4.28	10.31	25.56	181.45	17.33	86.57
STAKE 789	2087255	749080.2	0.20	3.79	14.00	29.63	207.13	21.94	116.36
STAKE 790	2087279	749055.4	0.23	4.21	9.49	24.66	175.78	16.30	79.89
STAKE 791	2087288	749085.8	0.15	3.69	11.30	26.64	188.26	18.57	94.54
STAKE 792	2087311	749059	0.24	4.40	22.25	38.93	266.95	32.26	182.98
STAKE 793	2087321	749094.8	0.20	3.70	12.20	27.63	194.51	19.69	101.82
STAKE 794	2087346	749059.6	0.23	4.32	11.15	26.48	187.22	18.38	93.33
STAKE 795	2087356	749102.2	0.08	3.64	11.60	26.97	190.34	18.94	96.97
STAKE 796	2087375	749063.7	0.23	4.36	9.29	24.44	174.41	16.05	78.27
STAKE 797	2087390	749106.4	0.20	3.75	10.80	26.09	184.80	17.94	90.50
STAKE 798	2087415	749081.7	0.22	4.10	9.85	25.05	178.27	16.75	82.82
STAKE 799	2087423	749113.2	0.21	3.95	10.94	26.25	185.80	18.12	91.67
STAKE 800	2087453	749120.9	0.18	2.59	11.80	27.19	191.73	19.19	98.58
STAKE 801	2087488	749126.5	0.21	4.00	5.03	19.84	145.82	10.73	43.90
STAKE 802	2087527	749127.6	0.23	4.09	1.08	15.65	120.05	5.78	11.99
STAKE 803	2087512	749099.7	0.21	3.85	2.00	16.61	125.93	6.93	19.36
STAKE 804	2087480	749094.3	0.19	3.49	7.76	22.78	164.04	14.14	65.92
STAKE 805	2087445	749085.5	0.20	3.70	10.30	25.55	181.36	17.32	86.46
STAKE 806	2087469	749061.6	0.21	4.05	11.57	26.94	190.14	18.91	96.74
STAKE 807	2087433	749055.6	0.23	4.09	11.72	27.11	191.17	19.09	97.94

**Appendix E**  
**HPGe Data**

STAKE NUMBER	Easting	Northing	U-235	U-238	Am-241	95% UCL Predicted Am-241	95% UCL Predicted Pu-239/240	Best Fit Predicted Am-241	Best Fit Predicted Pu-239/240
STAKE 808	2087399	749055.4	0.20	3.77	12.40	27.85	195.91	19.94	103.43
STAKE 809	2087503	749070	0.20	3.53	6.98	21.93	158.77	13.16	59.60
STAKE 810	2087494	749036.1	0.23	4.24	11.53	26.90	189.88	18.86	96.43
STAKE 811	2087475	749007.9	0.20	3.64	12.50	27.97	196.60	20.07	104.24
STAKE 812	2087456	749029.4	0.18	4.14	14.07	29.71	207.64	22.03	116.94
STAKE 813	2086429	748423.7	0.23	4.13	6.05	20.94	152.58	12.00	52.12
STAKE 814	2086409	748400.8	0.25	4.76	7.43	22.42	161.83	13.73	63.28
STAKE 815	2086464	748412.9	0.24	4.28	6.08	20.97	152.80	12.04	52.40
STAKE 816	2086438	748390.2	0.25	4.90	6.57	21.50	156.05	12.65	56.32
STAKE 817	2086494	748410.3	0.23	4.18	4.25	19.01	140.67	9.75	37.60
STAKE 818	2086475	748386.1	0.27	5.12	6.69	21.63	156.88	12.80	57.33
STAKE 819	2086624	748451.8	0.22	4.07	6.29	21.19	154.18	12.30	54.06
STAKE 820	2086658	748448.2	0.25	4.71	8.19	23.25	166.97	14.68	69.42
STAKE 821	2086233	748516.3	0.24	4.29	10.84	26.14	185.11	18.00	90.86
STAKE 822	2086223	748550.2	0.26	4.80	13.37	28.92	202.67	21.15	111.24
STAKE 823	2086210	748491.6	0.22	4.17	8.38	23.45	168.22	14.91	70.92
STAKE 824	2086200	748525.6	0.25	4.81	12.36	27.81	195.61	19.89	103.09
STAKE 825	2086188	748468.5	0.23	4.19	5.01	19.82	145.64	10.69	43.69
STAKE 826	2086178	748499.4	0.25	4.79	8.60	23.69	169.74	15.19	72.73
STAKE 827	2086163	748442	0.22	4.18	4.48	19.25	142.17	10.04	39.44
STAKE 828	2086153	748473.7	0.24	4.43	6.37	21.28	154.73	12.40	54.73
STAKE 829	2086143	748419.8	0.22	2.55	4.79	19.58	144.22	10.42	41.95
STAKE 830	2086131	748448.2	0.23	4.45	5.72	20.58	150.37	11.58	49.45
STAKE 831	2086108	748422	0.24	4.59	5.56	20.41	149.33	11.39	48.19
STAKE 832	2086167	748530	0.24	4.43	10.17	25.40	180.45	17.15	85.40
STAKE 833	2086145	748499.1	0.12	4.51	8.01	23.05	165.73	14.45	67.95
STAKE 834	2086124	748480.8	0.23	4.25	7.25	22.23	160.59	13.50	61.79
STAKE 835	2086092	748491.4	0.19	4.53	7.24	22.22	160.56	13.49	61.75
STAKE 836	2086098	748458.2	0.10	4.28	5.48	20.32	148.78	11.28	47.51
STAKE 837	2086066	748467.5	0.24	4.58	5.88	20.75	151.42	11.78	50.72
STAKE 838	2086217	748458.7	0.25	4.66	6.38	21.29	154.76	12.41	54.76
STAKE 839	2086227	748425.9	0.27	4.97	5.14	19.96	146.52	10.86	44.76
STAKE 840	2086241	748481.1	0.26	4.69	11.95	27.36	192.77	19.38	99.80
STAKE 841	2086252	748450.1	0.27	5.04	1.35	15.93	121.79	6.12	14.17
STAKE 842	2086272	748470.2	0.28	4.98	1.13	15.70	120.35	5.84	12.37
STAKE 843	2086264	748419	0.29	5.34	1.32	15.90	121.60	6.09	13.94
STAKE 844	2086268	748507.4	0.27	4.86	3.78	18.50	137.55	9.16	33.77
STAKE 845	2086297	748499.7	0.27	5.07	10.29	25.54	181.28	17.30	86.38
STAKE 846	2087230	749027.2	0.22	4.20	15.16	30.91	215.31	23.39	125.69
STAKE 847	2087252	749001.1	0.22	3.98	11.60	26.98	190.37	18.95	97.00
STAKE 848	2087263	749032.1	0.22	4.21	13.10	28.62	200.77	20.81	109.06
STAKE 849	2087287	749005.6	0.15	4.02	15.31	31.08	216.41	23.58	126.94
STAKE 850	2087272	748975.2	0.23	4.29	14.09	29.73	207.79	22.06	117.12
STAKE 851	2087289	748944.1	0.22	3.98	1.94	16.55	125.58	6.86	18.92
STAKE 852	2087305	748974.3	0.23	4.22	14.86	30.59	213.25	23.03	123.34
STAKE 853	2087326	748947	0.11	3.96	13.85	29.46	206.06	21.75	115.13
STAKE 854	2087316	748914.8	0.24	4.39	10.17	25.40	180.46	17.15	85.41
STAKE 855	2087343	748920.8	0.23	4.09	12.55	28.01	196.92	20.12	104.60
STAKE 856	2087331	748888.5	0.25	4.52	8.02	23.07	165.82	14.47	68.05
STAKE 857	2087366	748894.6	0.22	4.12	9.85	25.06	178.28	16.75	82.83
STAKE 858	2087352	748862	0.25	4.51	6.04	20.93	152.54	11.99	52.08

273

**Appendix E**  
**HPGe Data**

STAKE NUMBER	Easting	Northing	U-235	U-238	Am-241	95% UCL Predicted Am-241	95% UCL Predicted Pu-239/240	Best Fit Predicted Am-241	Best Fit Predicted Pu-239/240
STAKE 859	2087386	748864.3	0.24	4.29	7.81	22.84	164.40	14.20	66.35
STAKE 860	2087302	749039.4	0.22	4.13	15.25	31.02	216.00	23.51	126.47
STAKE 861	2087334	749026.8	0.09	3.83	9.86	25.06	178.32	16.76	82.88
STAKE 862	2087307	749005.3	0.23	4.15	12.64	28.12	197.57	20.24	105.36
STAKE 863	2087349	748994.2	0.21	3.89	12.62	28.09	197.42	20.21	105.19
STAKE 864	2087338	748974.5	0.23	4.27	15.36	31.14	216.76	23.64	127.33
STAKE 865	2087373	748972.3	0.21	3.86	10.97	26.28	186.00	18.16	91.90
STAKE 866	2087357	748952.8	0.12	4.25	13.05	28.58	200.46	20.76	108.70
STAKE 867	2087390	748943.9	0.22	4.06	10.70	25.99	184.12	17.82	89.70
STAKE 868	2087373	748917.1	0.24	4.30	13.45	29.01	203.24	21.25	111.89
STAKE 869	2087405	748916.2	0.22	3.98	9.57	24.75	176.35	16.40	80.57
STAKE 870	2087390	748887.7	0.27	4.74	12.23	27.67	194.73	19.73	102.07
STAKE 871	2087425	748885.8	0.22	3.96	9.50	24.67	175.87	16.31	80.00
STAKE 872	2087406	748856.9	0.26	4.79	11.74	27.13	191.31	19.12	98.10
STAKE 873	2087445	748800.5	0.12	3.30	6.73	21.66	157.10	12.85	57.59
STAKE 874	2087428	748829.3	0.26	4.78	9.09	24.23	173.09	15.80	76.70
STAKE 875	2087403	749028.5	0.21	3.88	13.06	28.59	200.55	20.77	108.80
STAKE 876	2087368	749028.8	0.24	4.49	18.11	34.22	236.52	27.08	149.54
STAKE 877	2087417	748995.7	0.14	3.87	13.18	28.72	201.37	20.92	109.74
STAKE 878	2087387	748996.6	0.22	4.16	13.01	28.52	200.14	20.70	108.33
STAKE 879	2087438	748967.9	0.22	3.89	13.11	28.64	200.88	20.83	109.18
STAKE 880	2087406	748971.2	0.23	4.39	8.54	23.63	169.37	15.12	72.28
STAKE 881	2087456	748942.7	0.20	3.81	6.56	21.49	156.00	12.64	56.26
STAKE 882	2087419	748940.6	0.23	4.38	10.69	25.97	184.04	17.80	89.61
STAKE 883	2087440	748909.2	0.21	3.84	8.01	23.06	165.77	14.46	68.00
STAKE 884	2087474	748910.6	0.24	4.43	11.34	26.69	188.56	18.62	94.90
STAKE 885	2087455	748878	0.22	3.97	7.25	22.22	160.58	13.49	61.78
STAKE 886	2087476	748845.4	0.26	4.85	8.50	23.59	169.07	15.07	71.93
STAKE 887	2087446	749005.8	0.21	3.80	13.78	29.38	205.58	21.67	114.58
STAKE 888	2087461	748974.6	0.24	4.54	13.74	29.33	205.28	21.62	114.23
STAKE 889	2087485	748948.2	0.21	3.85	9.05	24.18	172.80	15.75	76.36
STAKE 890	2087498	748976.8	0.13	4.65	15.99	31.85	221.29	24.44	132.46
STAKE 891	2087507	748919.9	0.21	3.85	8.47	23.55	168.85	15.02	71.66
STAKE 892	2087518	748952.1	0.23	4.27	11.05	26.36	186.50	18.25	92.49
STAKE 893	2087560	748899.1	0.20	3.61	5.22	20.04	147.05	10.96	45.41
STAKE 894	2087540	748925.5	0.23	4.41	10.85	26.14	185.11	18.00	90.87
STAKE 895	2087530	748984.5	0.21	3.92	9.90	25.11	178.61	16.81	83.22
STAKE 896	2087511	749008.4	0.24	4.39	15.83	31.66	220.10	24.23	131.12
STAKE 897	2087383	749160.8	0.19	2.91	10.76	26.05	184.55	17.89	90.21
STAKE 898	2087402	749129.3	0.21	4.12	11.12	26.44	186.99	18.34	93.06
STAKE 899	2087417	749167.5	0.23	4.11	0.94	15.50	119.15	5.61	10.86
STAKE 900	2087437	749144	0.21	4.04	10.02	25.25	179.46	16.97	84.23
STAKE 901	2087444	749172.9	0.20	3.94	0.93	15.48	119.04	5.59	10.72
STAKE 902	2087463	749150.1	0.27	4.83	1.26	15.83	121.17	6.00	13.39
STAKE 903	2087493	749159.1	0.17	4.02	0.39	14.92	115.63	4.92	6.42
STAKE 904	2086777	748558.2	0.25	4.63	7.43	22.43	161.84	13.73	63.29
STAKE 905	2086808	748549	0.23	4.23	10.74	26.03	184.38	17.86	90.01
STAKE 906	2086843	748540.4	0.24	4.59	10.70	25.99	184.13	17.82	89.72
STAKE 907	2086881	748537.2	0.22	4.03	5.05	19.87	145.96	10.75	44.07
STAKE 908	2086888	748504.3	0.25	4.80	5.58	20.44	149.48	11.42	48.36
STAKE 909	2086906	748527	0.23	4.17	5.42	20.26	148.42	11.22	47.07

**Appendix E**  
**HPGe Data**

STAKE NUMBER	Easting	Northing	U-235	U-238	Am-241	95% UCL Predicted Am-241	95% UCL Predicted Pu-239/240	Best Fit Predicted Am-241	Best Fit Predicted Pu-239/240
STAKE 910	2086863	748480.9	0.25	4.76	7.85	22.87	164.63	14.25	66.63
STAKE 911	2086850	748511.1	0.23	4.34	7.67	22.68	163.41	14.02	65.17
STAKE 912	2086832	748485.1	0.26	4.71	9.63	24.82	176.77	16.48	81.06
STAKE 913	2086819	748518.2	0.23	4.26	10.69	25.97	184.04	17.80	89.61
STAKE 914	2086848	748456.1	0.26	4.97	7.65	22.66	163.30	14.00	65.04
STAKE 915	2086814	748457.2	0.25	4.50	7.58	22.58	162.81	13.91	64.46
STAKE 916	2086931	748613.9	0.24	4.55	8.09	23.14	166.27	14.55	68.60
STAKE 917	2086536	748395.5	0.23	4.14	5.42	20.26	148.42	11.22	47.07
STAKE 918	2086941	748701	0.27	4.89	9.37	24.54	175.01	16.16	78.98
STAKE 919	2086928	748733.2	0.25	4.43	3.93	18.66	138.54	9.34	34.98
STAKE 920	2086972	748698.8	0.27	4.86	1.29	15.87	121.38	6.04	13.66
STAKE 921	2086961	748730.5	0.16	4.50	1.18	15.75	120.67	5.91	12.76
STAKE 922	2086901	748707	0.21	3.89	10.04	25.26	179.55	16.99	84.34
STAKE 923	2087197	748973.9	0.22	4.18	1.14	15.71	120.45	5.86	12.49
STAKE 924	2087161	748981.7	0.22	4.03	3.39	18.09	134.99	8.67	30.61
STAKE 925	2087203	748943.9	0.24	4.25	1.14	15.71	120.42	5.86	12.45
STAKE 926	2087180	748943	0.24	4.37	3.84	18.56	137.93	9.23	34.23
STAKE 927	2087182	748912.9	0.26	4.79	2.11	16.74	126.70	7.07	20.31
STAKE 928	2087210	748906	0.11	4.01	6.81	21.76	157.68	12.95	58.29
STAKE 929	2087195	748880.8	0.26	4.72	1.15	15.72	120.51	5.87	12.57
STAKE 930	2087227	748877	0.20	2.88	0.71	15.26	117.68	5.32	9.01
STAKE 931	2087209	748847.9	0.26	4.64	1.76	16.36	124.39	6.63	17.43
STAKE 932	2087239	748843.7	0.36	3.96	3.83	18.56	137.87	9.22	34.16
STAKE 933	2087223	748808.9	0.23	4.09	1.13	15.69	120.33	5.84	12.34
STAKE 934	2087249	748809.8	0.25	4.38	3.26	17.95	134.13	8.50	29.54
STAKE 935	2087270	748785.6	0.22	3.90	2.02	16.64	126.09	6.96	19.56
STAKE 936	2087236	748778.7	0.28	4.95	1.30	15.88	121.45	6.06	13.74
STAKE 937	2087308	748790.2	0.18	4.02	0.91	15.47	118.96	5.57	10.61
STAKE 938	2087301	748764.3	0.25	4.59	5.53	20.38	149.12	11.35	47.93
STAKE 939	2087335	748804.8	0.23	4.00	0.81	15.36	118.32	5.45	9.81
STAKE 940	2087332	748771.9	0.25	4.65	4.53	19.30	142.47	10.09	39.81
STAKE 941	2087313	748827.6	0.22	4.02	2.04	16.65	126.21	6.98	19.70
STAKE 942	2087342	748837.6	0.25	4.62	3.22	17.91	133.88	8.46	29.24
STAKE 943	2087314	748858.2	0.22	3.93	5.81	20.67	150.95	11.69	50.16
STAKE 944	2087296	748888	0.25	4.49	7.09	22.05	159.52	13.30	60.50
STAKE 945	2087287	748919.7	0.22	3.82	6.58	21.51	156.15	12.67	56.45
STAKE 946	2087258	748935.6	0.16	4.52	4.62	19.40	143.08	10.21	40.56
STAKE 947	2087248	748968.4	0.17	3.98	5.37	20.21	148.06	11.15	46.63
STAKE 948	2087224	748994.3	0.26	4.75	11.25	26.58	187.88	18.50	94.10
STAKE 949	2087034	748860.4	0.25	4.37	1.01	15.57	119.56	5.69	11.37
STAKE 950	2087072	748871.9	0.30	5.42	2.64	17.29	130.12	7.73	24.58
STAKE 951	2087061	748842.1	0.28	4.87	1.74	16.34	124.26	6.60	17.27
STAKE 952	2087037	748824.3	0.29	5.26	1.84	16.44	124.91	6.73	18.08
STAKE 953	2087526	749038.4	0.21	4.08	3.81	18.54	137.79	9.20	34.05
STAKE 954	2087534	749073.4	0.21	4.00	1.08	15.65	120.04	5.78	11.97
STAKE 955	2087537	749011.5	0.21	3.72	4.82	19.62	144.41	10.46	42.19
STAKE 956	2087555	749040.9	0.25	4.49	1.15	15.72	120.47	5.87	12.52
STAKE 957	2087576	749012.1	0.19	3.52	0.85	15.40	118.54	5.49	10.09
STAKE 958	2087586	749039.6	0.24	4.41	1.13	15.70	120.34	5.84	12.36
STAKE 959	2087610	749013.9	0.20	3.63	0.81	15.37	118.33	5.45	9.82
STAKE 960	2087576	749009.9	0.21	4.00	1.06	15.63	119.92	5.76	11.83

275

**Appendix E  
HPGe Data**

STAKE NUMBER	Easting	Northing	U-235	U-238	Am-241	95% UCL Predicted Am-241	95% UCL Predicted Pu-239/240	Best Fit Predicted Am-241	Best Fit Predicted Pu-239/240
STAKE 961	2087587	748960.4	0.19	3.56	0.79	15.34	118.19	5.42	9.65
STAKE 962	2087555	748958.3	0.25	4.67	9.31	24.46	174.55	16.07	78.43
STAKE 963	2086065	748808.7	0.32	3.85	6.17	21.06	153.35	12.14	53.06
STAKE 964	2086033	748809.2	0.25	4.71	22.90	39.68	271.83	33.08	188.26
STAKE 965	2086052	748838.4	0.24	4.24	24.75	41.82	285.77	35.39	203.20
STAKE 966	2086018	748836.1	0.26	4.83	31.63	49.89	339.09	44.00	258.83
STAKE 967	2086036	748864.6	0.23	4.16	3.27	17.96	134.22	8.52	29.66
STAKE 968	2086000	748865.6	0.24	4.41	4.12	18.87	139.80	9.59	36.54
STAKE 969	2086095	748862.1	0.25	4.40	10.87	26.17	185.28	18.03	91.06
STAKE 970	2086061	748862.4	0.19	4.77	7.39	22.38	161.54	13.67	62.93
STAKE 971	2086109	748833.6	0.23	4.23	33.93	52.64	357.43	46.88	277.43
STAKE 972	2086076	748833.6	0.26	4.83	20.92	37.42	257.14	30.61	172.30
STAKE 973	2086126	748805.1	0.21	3.84	36.69	55.95	379.69	50.32	299.65
STAKE 974	2086094	748804.7	0.23	4.40	12.87	28.38	199.20	20.53	107.24
STAKE 975	2086198	748811.7	0.22	3.98	14.59	30.28	211.27	22.68	121.09
STAKE 976	2086159	748806.9	0.22	4.36	23.34	40.19	275.11	33.62	191.79
STAKE 977	2087577	748929.1	0.22	4.03	1.12	15.68	120.26	5.83	12.25
STAKE 978	2087607	748930.5	0.22	4.14	1.12	15.69	120.31	5.83	12.31
STAKE 979	2087533	748892.6	0.23	4.28	9.97	25.19	179.12	16.91	83.83
STAKE 980	2087587	748873.1	0.24	4.31	1.10	15.67	120.19	5.81	12.17
STAKE 981	2087523	748859.2	0.23	4.32	6.21	21.10	153.63	12.20	53.39
STAKE 982	2087562	748984.1	0.21	3.96	1.72	16.32	124.14	6.58	17.12
STAKE 983	2085961	748811.2	0.27	4.91	3.16	17.85	133.52	8.39	28.79
STAKE 984	2085993	748810.6	0.25	4.70	17.02	33.00	228.66	25.72	140.76
STAKE 985	2086149	748839.1	0.24	4.54	21.60	38.20	262.18	31.46	177.80
STAKE 986	2086173	748836.5	0.25	4.70	20.35	36.77	252.93	29.89	167.69
STAKE 987	2086220	748837.2	0.24	4.54	24.35	41.36	282.78	34.90	200.01
STAKE 988	2086250	748838	0.24	4.55	32.85	51.35	348.79	45.53	268.70
STAKE 989	2086235	748808.2	0.21	3.98	7.85	22.88	164.67	14.25	66.67
STAKE 990	2086368	748853.4	0.24	4.56	38.38	58.01	393.55	52.44	313.32
STAKE 991	2086391	748876.5	0.25	4.59	16.09	31.96	222.00	24.56	133.27
STAKE 992	2086336	748865.9	0.23	4.47	43.74	64.60	438.43	59.15	356.64
STAKE 993	2086349	748882.5	0.22	4.19	48.36	70.38	478.23	64.93	393.98
STAKE 994	2086303	748870.9	0.24	4.44	9.43	24.59	175.38	16.22	79.42
STAKE 995	2086326	748894.3	0.12	4.11	7.14	22.11	159.84	13.36	60.89
STAKE 996	2085772	748593	0.25	4.56	1.20	15.77	120.81	5.93	12.94
STAKE 997	2085797	748592.9	0.11	4.19	0.78	15.32	118.08	5.40	9.50
STAKE 998	2085736	748595.3	0.25	4.61	2.37	17.01	128.36	7.39	22.39
STAKE 999	2085748	748566.4	0.22	3.93	0.92	15.48	119.01	5.58	10.68

Appendix E  
Borehole RFCA Tier I and Tier II RSAL Calculation Results

Borehole	EASTING	NORTHING	Material	Interval(ft)	unit_code	U-233/234 pCi/g	U-235 pCi/g	U-238 pCi/g	Pu 239/240 pCi/g	Am-241 pCi/g	RFCA Tier I (Sum of Ratio)	RFCA Tier II (Sum of Ratio)
90098	2085611	749212	asphalt	0.0-0.6	PCI/G	0.909	0.034	0.888	0.042	0.065	0.003	0.015
90198	2085686	749214	asphalt	0.0-0.5	PCI/G	0.842	0.039	0.919	0.029	0.015	0.002	0.014
90398	2085835	749215	asphalt	0.0-0.4	PCI/G	0.746	0.041	0.791	0.097	0.043	0.002	0.013
90698	2085685	749139	asphalt	0.0-0.5	PCI/G	0.672	0.038	0.607	0.001	0.016	0.002	0.010
90798	2085760	749137	asphalt	0.0-0.4	PCI/G	0.859	0.035	0.851	0.01	0.053	0.002	0.014
91198	2085685	749064	asphalt	0.0-0.4	PCI/G	0.782	0.012	0.736	0.047	0.03	0.002	0.011
91298	2085760	749062	asphalt	0.0-0.5	PCI/G	0.665	0.04	0.596	-0.002	0.048	0.002	0.011
91898	2085834	748990	asphalt	0.0-0.6	PCI/G	1.13	0.133	0.75	1.22	0.341	0.005	0.030
91998	2085909	748990	asphalt	0.0-0.5	PCI/G	0.663	0.049	0.598	0.034	0.022	0.002	0.011
96098	2085612	749211	bedrock	15.8-16.0	PCI/G	0.185	-0.006	0.215	0.042	-0.049	0.000	0.001
96198	2085687	749213	bedrock	15.5-15.8	PCI/G	0.412	0.047	0.707	0.25	0.036	0.002	0.012
96298	2085611	749135	bedrock	15.9-16.1	PCI/G	0.515	0.064	0.795	0.008	0.007	0.002	0.012
96398	2085610	749061	bedrock	16.0-16.2	PCI/G	0.731	0.073	0.69	0.041	0.007	0.002	0.012
96498	2085910	749141	bedrock	21.4-22.0	PCI/G	0.538	0.009	0.782	0.186	0.075	0.002	0.012
96598	2085867	749147	bedrock	22.7-22.9	PCI/G	0.904	0.063	0.842	0.044	0.017	0.003	0.014
96698	2085846	749128	bedrock	22.8-23.0	PCI/G	0.603	0.113	0.43	0.048	0	0.002	0.011
96898	2085713	749095	bedrock	16.2-16.4	PCI/G	0.402	0.048	0.388	0.357	0.207	0.002	0.014
96998	2085711	749038	bedrock	17.5-17.6	PCI/G	0.337	0.01	0.693	0.008	0.076	0.002	0.010
97098	2085611	748986	bedrock	16.2-16.5	PCI/G	0.444	0.017	0.618	0.032	0.054	0.002	0.010
97198	2085611	748911	bedrock	24.2-24.4	PCI/G	0.404	0.015	0.526	0.038	0	0.001	0.007
97298	2085930	748844	bedrock	17.9-18.1	PCI/G	0.358	0.054	0.748	0.019	0.068	0.002	0.013
90098	2085611	749212	fill	0.6-1.0	PCI/G	0.837	0.077	1.09	2.93	0.655	0.008	0.045
90198	2085686	749214	fill	0.5-0.9	PCI/G	0.913	0.033	0.857	2.62	0.536	0.007	0.037
90298	2085761	749211	fill	0.5-0.8	PCI/G	1.06	0.051	1.24	20.5	5.21	0.042	0.236
90398	2085835	749215	fill	0.4-0.8	PCI/G	0.837	0.029	0.939	1.37	0.309	0.005	0.027
90698	2085685	749139	fill	0.5-0.8	PCI/G	0.956	0.035	1.21	0.686	0.105	0.004	0.022
90798	2085760	749137	fill	0.4-0.8	PCI/G	1.08	0.079	1.08	8.13	1.7	0.017	0.094
91198	2085685	749064	fill	0.4-0.9	PCI/G	0.728	0.042	0.844	4.6	0.908	0.010	0.054
91298	2085760	749062	fill	0.5-1.0	PCI/G	1.12	0.066	1.24	7.45	1.41	0.015	0.085
91798	2085759	748989	fill	0.5-1.1	PCI/G	1.22	0.055	1.16	4.36	0.801	0.010	0.056
91898	2085834	748990	fill	0.6-1.1	PCI/G	2.02	0.487	2.77	558	126	0.986	5.584
91998	2085909	748990	fill	0.5-0.9	PCI/G	0.907	0.058	0.174	0.41	0.084	0.002	0.011
92298	2085760	748914	fill	0.5-0.9	PCI/G	0.997	0.066	1.2	34	6.43	0.057	0.322
91198	2085685	749064	native	11.1-11.6	PCI/G	0.412	0	0.613	0.01	0.02	0.001	0.008
91198	2085685	749064	native	15.1-15.5	PCI/G	0.467	0.04	0.574	0.073	0.028	0.002	0.010
91198	2085685	749064	native	18.6-19.1	PCI/G	0.48	0.031	0.603	0.009	0.007	0.002	0.009

Borehole\_SORs

Appendix E  
Borehole RFCA Tier I and Tier II RSAL Calculation Results

Borehole	EASTING	NORTHING	Material	Interval(ft)	unit_code	U-233/234 pCi/g	U-235 pCi/g	U-238 pCi/g	Pu 239/240 pCi/g	Am-241 pCi/g	RFCA Tier I (Sum of Ratio)	RFCA Tier II (Sum of Ratio)
91198	2085685	749064	native	19.8-20.2	PCI/G	0.578	0.037	0.698	0.047	0.077	0.002	0.012
91198	2085685	749064	native	7.4-7.7	PCI/G	0.315	0.009	0.341	0.009	0.007	0.001	0.005
92598	2085560	749064	native	12.0-12.5	PCI/G	0.379	0.027	0.4	0.056	0.041	0.001	0.008
92598	2085560	749064	native	16.0-16.75	PCI/G	0.353	0.027	0.437	0.033	-0.005	0.001	0.007
92598	2085560	749064	native	3.5-4.0	PCI/G	0.491	0.017	0.532	0.609	0.072	0.002	0.012
92598	2085560	749064	native	7.5-8.0	PCI/G	0.433	0.024	0.455	0.021	0.016	0.001	0.007
95998	2085893	749140	native	12.2-12.4	PCI/G	0.475	0.137	0.61	0.027	0.035	0.003	0.014
95998	2085893	749140	native	15.2-15.4	PCI/G	0.572	0.118	0.773	0.004	0	0.003	0.014
95998	2085893	749140	native	17.5-17.9	PCI/G	0.6	0.106	0.483	0.023	0	0.002	0.011
95998	2085893	749140	native	20.2-20.6	PCI/G	0.455	0.21	1.08	-0.019	0.016	0.004	0.021
95998	2085893	749140	native	4.8-5.0	PCI/G	0.315	0.194	0.657	-0.003	0	0.003	0.015
95998	2085893	749140	native	8.2-8.4	PCI/G	0.636	0.147	0.692	0	0.033	0.003	0.016
96098	2085612	749211	native	12.3-12.5	PCI/G	0.743	0.015	1.35	0.602	0.844	0.007	0.041
96098	2085612	749211	native	4.3-4.5	PCI/G	0.312	0.033	0.705	0.047	0.003	0.002	0.010
96098	2085612	749211	native	8.2-8.5	PCI/G	0.386	0	0.583	0.067	0.079	0.002	0.009
96198	2085687	749213	native	11.8-12.0	PCI/G	0.606	0.025	0.688	0.231	0.103	0.002	0.013
96198	2085687	749213	native	4.2-4.4	PCI/G	0.505	0.017	0.677	0.021	0.083	0.002	0.011
96198	2085687	749213	native	7.7-8.1	PCI/G	0.539	0.016	0.484	0.093	0.075	0.002	0.009
96298	2085611	749135	native	11.9-12.25	PCI/G	0.546	0.016	0.752	0.068	0.075	0.002	0.012
96298	2085611	749135	native	4.0-4.3	PCI/G	0.585	0.003	0.848	2.84	0.323	0.005	0.030
96298	2085611	749135	native	7.0-8.0	PCI/G	0.656	0.113	1.06	1.63	1.8	0.013	0.071
96398	2085610	749061	native	12.2-12.4	PCI/G	0.588	0.046	0.715	1.83	0.677	0.006	0.036
96398	2085610	749061	native	4.0-4.3	PCI/G	0.539	0.016	0.563	1.99	0.231	0.004	0.022
96398	2085610	749061	native	8.2-8.4	PCI/G	0.309	0.05	0.442	0.522	0.188	0.003	0.014
96498	2085910	749141	native	12.2-13.0	PCI/G	0.382	0.012	0.562	0.077	0.051	0.002	0.009
96498	2085910	749141	native	15.3-16.0	PCI/G	0.45	0.033	0.544	0.504	0.191	0.003	0.015
96498	2085910	749141	native	17.7-18.0	PCI/G	0.366	0.01	0.468	0.361	0.101	0.002	0.010
96498	2085910	749141	native	4.4-4.8	PCI/G	0.349	0.027	0.296	1.11	0.132	0.002	0.013
96498	2085910	749141	native	9.0-9.5	PCI/G	0.398	0.031	0.533	0.528	0.06	0.002	0.011
96598	2085867	749147	native	11.4-11.6	PCI/G	0.422	0.04	0.55	0.032	0.011	0.002	0.009
96598	2085867	749147	native	15.6-15.8	PCI/G	0.589	0.019	0.654	0.031	0.05	0.002	0.010
96598	2085867	749147	native	18.4-18.6	PCI/G	0.43	0	0.449	0.027	0	0.001	0.006
96598	2085867	749147	native	4.0-4.2	PCI/G	0.417	0.033	0.389	0.071	0	0.001	0.007
96598	2085867	749147	native	8.2-8.4	PCI/G	0.413	0.016	0.398	-0.006	0.016	0.001	0.006
96698	2085846	749128	native	12.2-12.4	PCI/G	0.403	0.003	0.542	0.009	0.008	0.001	0.007
96698	2085846	749128	native	17.5-17.7	PCI/G	0.629	0.069	0.678	0.01	0.015	0.002	0.012



Appendix E  
Borehole RFCA Tier I and Tier II RSAL Calculation Results

Borehole	EASTING	NORTHING	Material	Interval(ft)	unit_code	U-233/234 pCi/g	U-235 pCi/g	U-238 pCi/g	Pu 239/240 pCi/g	Am-241 pCi/g	RFCA Tier I (Sum of Ratio)	RFCA Tier II (Sum of Ratio)
96698	2085846	749128	native	20.0-20.2	PCI/G	0.383	0.163	0.364	0.448	0.09	0.003	0.016
96698	2085846	749128	native	4.0-4.2	PCI/G	0.669	0.034	0.584	0.008	0	0.002	0.009
96698	2085846	749128	native	8.2-8.4	PCI/G	0.504	0.009	0.597	0.025	0.041	0.002	0.009
96798	2085866	749108	native	12.2-12.5	PCI/G	0.647	0.071	0.788	0.017	0.026	0.002	0.013
96798	2085866	749108	native	16.6-16.8	PCI/G	0.506	0.026	0.796	-0.008	0.036	0.002	0.011
96798	2085866	749108	native	20.0-20.4	PCI/G	0.578	0.055	0.52	0	0.053	0.002	0.011
96798	2085866	749108	native	4.2-4.4	PCI/G	1.4	0.097	1.46	0.017	0	0.004	0.023
96798	2085866	749108	native	8.2-8.4	PCI/G	0.281	0.019	0.693	0.047	0.018	0.002	0.009
96898	2085713	749095	native	12.1-12.3	PCI/G	0.389	0.016	0.325	0.121	0.295	0.002	0.013
96898	2085713	749095	native	4.2-4.4	PCI/G	0.479	0.003	0.54	0.348	0.098	0.002	0.011
96898	2085713	749095	native	8.2-8.4	PCI/G	0.435	0.009	0.495	0.459	0.044	0.002	0.010
96998	2085711	749038	native	12.2-12.4	PCI/G	0.614	0.032	0.69	0.013	-0.007	0.002	0.010
96998	2085711	749038	native	4.2-4.4	PCI/G	0.502	0.03	0.652	0.052	0.069	0.002	0.011
96998	2085711	749038	native	8.2-8.4	PCI/G	0.523	0.017	0.566	-0.006	0.002	0.001	0.008
97098	2085611	748986	native	12.2-12.4	PCI/G	0.82	0.009	0.783	0.198	0.05	0.002	0.013
97098	2085611	748986	native	4.0-4.2	PCI/G	0.472	-0.012	0.608	1.33	0.508	0.005	0.026
97098	2085611	748986	native	8.2-8.4	PCI/G	0.564	0.002	0.657	1.24	0.163	0.003	0.018
97198	2085611	748911	native	12.2-12.4	PCI/G	0.776	0.035	0.967	0.049	0.105	0.003	0.016
97198	2085611	748911	native	15.4-15.5	PCI/G	0.406	0	0.451	0.013	0.108	0.002	0.009
97198	2085611	748911	native	20.2-20.4	PCI/G	0.367	0.047	0.531	0.163	0.037	0.002	0.010
97198	2085611	748911	native	4.2-4.4	PCI/G	0.613	0.063	0.697	0.118	0.085	0.002	0.014
97198	2085611	748911	native	7.0-7.3	PCI/G	0.573	0.014	0.557	0.482	0.153	0.002	0.014
97298	2085930	748844	native	12.2-12.4	PCI/G	0.592	0.053	0.512	0.098	0.067	0.002	0.011
97298	2085930	748844	native	16.2-16.4	PCI/G	0.387	0.058	0.423	0.157	0.046	0.002	0.010
97298	2085930	748844	native	4.4-4.6	PCI/G	0.441	0.012	0.779	0.023	0.032	0.002	0.010
97298	2085930	748844	native	8.2-8.4	PCI/G	0.673	0.031	0.617	0.009	0.016	0.002	0.010
97698	2085880	749135	native	11.6-11.8	PCI/G	0.511	0.042	0.695	0.019	0	0.002	0.010
97698	2085880	749135	native	13.9-14.1	PCI/G	0.38	0.021	0.62	0	0	0.001	0.008
97698	2085880	749135	native	16.1-16.3	PCI/G	0.442	0.122	0.687	0.018	0.034	0.003	0.014
97698	2085880	749135	native	18.0-18.2	PCI/G	0.527	0.144	0.977	0.048	0.018	0.003	0.018
97698	2085880	749135	native	19.8-20.0	PCI/G	0.473	-0.01	0.486	0	0	0.001	0.006
97698	2085880	749135	native	4.2-4.6	PCI/G	0.519	0.122	0.5	0.06	0.011	0.002	0.012
97698	2085880	749135	native	8.6-8.8	PCI/G	0.4	0.08	0.538	0.021	0.039	0.002	0.011
90098	2085611	749212	native 1	1.0-1.5	PCI/G	1.14	0.071	1.68	4.85	0.958	0.012	0.067
90198	2085686	749214	native 1	0.9-1.4	PCI/G	1.58	0.384	1.9	711	87	0.909	5.150
90298	2085761	749211	native 1	0.8-1.1	PCI/G	3.11	0.213	8.5	9110	1510	13.416	75.989

**Appendix E**  
**Borehole RFCA Tier I and Tier II RSAL Calculation Results**

Borehole	EASTING	NORTHING	Material	Interval(ft)	unit_code	U-233/234 pCi/g	U-235 pCi/g	U-238 pCi/g	Pu 239/240 pCi/g	Am-241 pCi/g	RFCA Tier I (Sum of Ratio)	RFCA Tier II (Sum of Ratio)
90398	2085835	749215	native 1	0.8-1.3	PCI/G	0.748	0.026	0.894	3.01	0.592	0.007	0.040
90498	2085910	749216	native 1	0.7-1.2	PCI/G	1.37	0.158	2.68	284	50.4	0.440	2.490
90598	2085610	749137	native 1	1.1-1.6	PCI/G	0.842	0.038	1.59	142	33.9	0.261	1.475
90698	2085685	749139	native 1	0.8-1.5	PCI/G	5.14	0.577	7.92	10670	1880	16.232	91.933
90798	2085760	749137	native 1	0.8-1.5	PCI/G	0.973	0.134	1.91	260	69.5	0.510	2.888
90898	2085835	749140	native 1	0.9-1.4	PCI/G	3.56	0.169	5.21	685	158	1.226	6.945
90998	2085910	749141	native 1	0.8-1.3	PCI/G	10.8	0.566	26.8	1210	268	2.149	12.173
91098	2085610	749062	native 1	1.4-1.9	PCI/G	0.749	0.091	1.23	2500	377	3.506	19.860
91198	2085685	749064	native 1	0.9-1.3	PCI/G	0.848	0.032	1.54	125	21.8	0.192	1.089
91298	2085760	749062	native 1	1.0-1.5	PCI/G	0.798	0.066	1.51	242	36.3	0.342	1.936
91398	2085834	749065	native 1	0.8-1.3	PCI/G	178	16.9	780	6600	1210	11.805	66.889
91498	2085909	749066	native 1	0.8-1.3	PCI/G	6.18	1.74	15.2	768	146	1.259	7.130
91598	2085610	748987	native 1	1.5-2.0	PCI/G	19.8	7.2	28.2	152260	31670	253.965	1438.266
91698	2085684	748989	native 1	0.9-1.4	PCI/G	1.83	-0.913	0.913	389	3930	18.547	104.941
91798	2085759	748989	native 1	1.1-1.6	PCI/G	0.838	0.045	1.72	7960	535	8.062	45.688
91898	2085834	748990	native 1	1.1-1.6	PCI/G	10.7	2.52	13.2	2420	554	4.318	24.450
91998	2085909	748990	native 1	0.9-1.4	PCI/G	2.53	0.961	2.69	581	116	0.959	5.433
92098	2085609	748913	native 1	0.9-1.4	PCI/G	1.3	0.038	1.03	0.969	12.4	0.061	0.346
92298	2085760	748914	native 1	0.9-1.6	PCI/G	0.764	0.029	0.866	18	3.88	0.033	0.186
92198	2085684	748914	native 1	0.7-1.2	PCI/G	1.37	0.048	0.62	104	19.8	0.167	0.946
92398	2085834	748915	native 1	1.3-1.8	PCI/G	0.797	0.073	0.656	10	1.41	0.016	0.089
92498	2085909	748915	native 1	1.1-1.6	PCI/G	0.758	0.092	1.1	474	59.5	0.611	3.464
92598	2085560	749064	native 1	0.0-0.2	PCI/G	0.966	0.18	1.15	93.6	16.7	0.147	0.833
92698	2085551	748977	native 1	0.0-0.4	PCI/G	0.788	0.062	0.789	5.83	0.99	0.011	0.062
92798	2085553	748827	native 1	0.0-0.4	PCI/G	1.05	0.045	0.852	3.49	0.565	0.007	0.042
92898	2085703	748830	native 1	0.5-1.0	PCI/G	1	0.038	0.994	0.817	0.154	0.004	0.022
92998	2085853	748830	native 1	0.0-0.5	PCI/G	0.418	0.016	0.494	90.2	15.6	0.137	0.775
93098	2086005	748817	native 1	0.0-0.5	PCI/G	0.866	0.017	0.863	37.6	7.86	0.065	0.368
93198	2086167	748839	native 1	0.0-0.5	PCI/G	1.29	-0.196	2.53	808	128	1.164	6.595
93298	2085755	748671	native 1	0.0-0.5	PCI/G	0.963	0.051	1.42	45.9	9.3	0.079	0.446
93398	2085857	748698	native 1	0.0-0.5	PCI/G	1.34	0.033	1.33	19.1	3.39	0.032	0.184
93498	2086198	748702	native 1	0.0-0.5	PCI/G	1.05	0.066	1.56	326	56.1	0.493	2.791
93598	2085978	748977	native 1	0.0-0.4	PCI/G	0.893	0.169	1.82	417	80.5	0.671	3.801
93698	2086153	748988	native 1	0.0-0.5	PCI/G	1.13	0.086	3.78	1170	225	1.873	10.608
93798	2086300	748976	native 1	0.0-0.45	PCI/G	1.27	0.123	0.538	472	75.6	0.684	3.877
93898	2086406	749003	native 1	0.0-0.5	PCI/G	0.803	0.017	1.16	196	35.9	0.307	1.737

**Appendix E**  
**Borehole RFCA Tier I and Tier II RSAL Calculation Results**

Borehole	EASTING	NORTHING	Material	Interval(ft)	unit_code	U-233/234 pCi/g	U-235 pCi/g	U-238 pCi/g	Pu 239/240 pCi/g	Am-241 pCi/g	RFCA Tier I (Sum of Ratio)	RFCA Tier II (Sum of Ratio)
93998	2086000	749123	native 1	0.0-0.5	PCI/G	0.98	0.053	1.15	39.3	8	0.068	0.383
94098	2086128	749117	native 1	0.0-0.4	PCI/G	35.8	4.17	75.7	14950	3140	25.247	142.982
94198	2086298	749123	native 1	0.0-0.4	PCI/G	1.13	0.051	1.66	229	35.7	0.330	1.870
94298	2086438	749112	native 1	0.0-0.5	PCI/G	0.859	0.033	1.03	56.3	10	0.088	0.501
94398	2085550	749129	native 1	0.0-0.3	PCI/G	1.06	0.032	1.06	2.32	0.497	0.007	0.037
94498	2085552	749264	native 1	0.0-0.3	PCI/G	0.949	0.096	0.949	4.9	0.839	0.010	0.058
94598	2085703	749265	native 1	0.0-0.5	PCI/G	0.801	0.014	0.995	19.2	2.91	0.029	0.166
94698	2085852	749265	native 1	0.0-0.45	PCI/G	0.822	0.034	0.905	9.32	2.14	0.019	0.106
94798	2086000	749266	native 1	0.0-0.5	PCI/G	0.587	0.064	0.795	30.6	5.05	0.047	0.267
94898	2086149	749243	native 1	0.0-0.4	PCI/G	0.798	0.056	1.32	362	80.8	0.632	3.581
94998	2086298	749244	native 1	0.0-0.5	PCI/G	0.997	0.085	1.31	162	36.7	0.288	1.628
95098	2086447	749243	native 1	0.0-0.5	PCI/G	1	-0.012	0.993	18.8	3.34	0.031	0.175
95198	2086149	749188	native 1	0.0-0.5	PCI/G	3.28	0.122	8.66	3300	880	6.420	36.353
95298	2086066	749123	native 1	0.0-0.5	PCI/G	0.78	0.062	0.827	10.6	1.96	0.019	0.107
95398	2086211	749120	native 1	0.0-0.5	PCI/G	1.94	0.188	6.34	978	182	1.544	8.746
95498	2086078	748987	native 1	0.0-0.45	PCI/G	0.772	0.022	1.01	49.8	8.51	0.077	0.435
95598	2086229	748984	native 1	0.0-0.5	PCI/G	1.14	0.055	2.74	858	176	1.425	8.069
95698	2086077	749248	native 1	0.0-0.5	PCI/G	0.765	0.046	1.54	135	26.9	0.223	1.263
95798	2086148	749268	native 1	0.0-0.5	PCI/G	0.911	0.049	0.962	40.3	6.69	0.062	0.350
95898	2086219	749244	native 1	0.0-0.5	PCI/G	0.94	0.056	1.3	27.3	5.03	0.046	0.259
97398	2086096	748827	native 1	0.0-0.5	PCI/G	0.884	0.116	0.917	278	45	0.407	2.304
97498	2086182	748770	native 1	0.0-0.45	PCI/G	0.762	0.004	1.14	82.7	11.6	0.114	0.647
97598	2086247	748845	native 1	0.0-0.5	PCI/G	1.2	0.018	1.47	75.7	15.7	0.129	0.732
90098	2085611	749212	native 2	1.5-2.0	PCI/G	0.587	0.027	0.598	0.135	0.031	0.002	0.010
90198	2085686	749214	native 2	1.4-1.9	PCI/G	0.491	0.022	0.651	0.656	0.122	0.003	0.015
90298	2085761	749211	native 2	1.1-1.7	PCI/G	1.63	0.105	3.5	25	6.26	0.054	0.308
90398	2085835	749215	native 2	1.3-1.8	PCI/G	0.565	0.011	0.594	0.403	0.306	0.003	0.018
90498	2085910	749216	native 2	1.2-1.7	PCI/G	0.721	0.034	0.87	50.1	9.35	0.081	0.457
90598	2085610	749137	native 2	1.6-2.1	PCI/G	0.502	0.029	0.58	0.224	0.05	0.002	0.011
90698	2085685	749139	native 2	1.5-2.1	PCI/G	0.383	0.018	0.394	12.3	1.89	0.018	0.104
90798	2085760	749137	native 2	1.5-2.0	PCI/G	0.36	0.02	0.397	6.22	0.917	0.010	0.055
90898	2085835	749140	native 2	1.4-1.9	PCI/G	0.324	0.032	0.379	0.848	0.296	0.003	0.017
90998	2085910	749141	native 2	1.3-1.8	PCI/G	2.85	0.227	15.7	13.6	2.4	0.051	0.288
91098	2085610	749062	native 2	1.9-2.4	PCI/G	0.914	0.056	0.967	21.7	3.93	0.036	0.204
91198	2085685	749064	native 2	1.3-1.9	PCI/G	0.39	0.012	0.304	5.52	0.744	0.008	0.046
91298	2085760	749062	native 2	1.5-2.0	PCI/G	0.284	0.007	0.319	1.49	0.229	0.003	0.016

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**Appendix E**  
**Borehole RFCA Tier I and Tier II RSAL Calculation Results**

Borehole	EASTING	NORTHING	Material	Interval(ft)	unit_code	U-233/234 pCi/g	U-235 pCi/g	U-238 pCi/g	Pu 239/240 pCi/g	Am-241 pCi/g	RFCA Tier I (Sum of Ratio)	RFCA Tier II (Sum of Ratio)
91398	2085834	749065	native 2	1.3-1.8	PCI/G	0.436	0.065	0.721	201	10.3	0.191	1.080
91498	2085909	749066	native 2	1.3-1.8	PCI/G	0.723	0.045	2.35	9.1	1.69	0.019	0.108
91598	2085610	748987	native 2	2.0-2.5	PCI/G	0.977	0.137	1.12	167	33.2	0.275	1.556
91698	2085684	748989	native 2	1.4-1.9	PCI/G	1.45	0.252	1.89	0.937	7.05	0.039	0.223
91798	2085759	748989	native 2	1.6-2.0	PCI/G	0.537	0.046	0.771	5.98	1.08	0.011	0.063
91898	2085834	748990	native 2	1.6-2.1	PCI/G	1.65	0.379	1.38	212	29.2	0.290	1.644
91998	2085909	748990	native 2	1.4-1.9	PCI/G	11.4	6.57	8.51	1480	256	2.296	13.003
92098	2085609	748913	native 2	1.4-1.9	PCI/G	0.904	0.022	0.72	0.381	0.172	0.003	0.017
92198	2085684	748914	native 2	1.2-1.7	PCI/G	0.04	0.05	0.824	0.16	0.15	0.003	0.015
92298	2085760	748914	native 2	1.6-2.0	PCI/G	0.963	0.043	0.996	1.79	0.28	0.005	0.029
92398	2085834	748915	native 2	1.8-2.3	PCI/G	0.652	0.039	0.69	2.93	0.591	0.007	0.038
92498	2085909	748915	native 2	1.6-2.1	PCI/G	0.56	0.045	0.54	0.408	0.055	0.002	0.012
92598	2085560	749064	native 2	0.2-1.0	PCI/G	0.726	0.03	0.832	14	2.64	0.024	0.137
92698	2085551	748977	native 2	0.4-0.9	PCI/G	0.442	0.022	0.516	1.22	0.345	0.004	0.021
92798	2085553	748827	native 2	0.4-0.9	PCI/G	0.621	0.011	0.694	0.303	0.049	0.002	0.012
92898	2085703	748830	native 2	1.0-1.5	PCI/G	0.926	0.051	0.972	0.932	0.177	0.004	0.023
92998	2085853	748830	native 2	0.5-1.0	PCI/G	0.607	0.014	0.551	5.76	1.1	0.011	0.060
93098	2086005	748817	native 2	0.5-1.0	PCI/G	0.961	0.066	0.877	6.1	1.33	0.013	0.074
93198	2086167	748839	native 2	0.5-1.0	PCI/G	0.941	0.028	1.29	62.8	9.88	0.093	0.526
93298	2085755	748671	native 2	0.5-1.0	PCI/G	0.825	-0.007	0.854	0.906	0.114	0.003	0.017
93398	2085857	748698	native 2	0.5-1.0	PCI/G	1.27	0.046	1.25	1.87	0.45	0.007	0.037
93498	2086198	748702	native 2	0.5-1.0	PCI/G	0.694	0.066	1.09	9.01	1.67	0.017	0.095
93598	2085978	748977	native 2	0.4-0.8	PCI/G	0.499	0.015	0.522	9.34	1.25	0.014	0.077
93698	2086153	748988	native 2	0.5-1.0	PCI/G	0.511	0.032	0.764	49.5	9.95	0.083	0.469
93798	2086300	748976	native 2	0.45-0.9	PCI/G	0.413	0.033	0.369	4.12	0.957	0.008	0.048
93898	2086406	749003	native 2	0.5-1.0	PCI/G	0.915	0.035	1.15	34.6	5.46	0.052	0.297
93998	2086000	749123	native 2	0.5-1.0	PCI/G	0.492	0.029	0.541	4.64	0.668	0.008	0.044
94098	2086128	749117	native 2	0.4-0.8	PCI/G	0.679	0.051	0.988	28.6	4.96	0.046	0.258
94198	2086298	749123	native 2	0.4-0.8	PCI/G	0.569	0.028	0.545	13.9	2.51	0.023	0.130
94298	2086438	749112	native 2	0.5-1.0	PCI/G	0.862	0.049	0.911	25.4	2.93	0.034	0.192
94398	2085550	749129	native 2	0.3-0.7	PCI/G	0.74	0.014	0.565	0.149	0.052	0.002	0.010
94498	2085552	749264	native 2	0.3-0.8	PCI/G	0.876	0.061	0.729	1.26	0.302	0.004	0.025
94598	2085703	749265	native 2	0.5-1.0	PCI/G	0.918	0.038	1.03	11.4	2.44	0.022	0.124
94698	2085852	749265	native 2	0.45-0.9	PCI/G	0.662	0.072	0.811	23.3	3.43	0.035	0.196
94798	2086000	749266	native 2	0.5-1.0	PCI/G	0.725	0.066	0.883	27	4.47	0.042	0.238
94898	2086149	749243	native 2	0.4-0.8	PCI/G	1.07	0.074	2.3	785	209	1.527	8.644

**Appendix E**  
**Borehole RFCA Tier I and Tier II RSAL Calculation Results**

Borehole	EASTING	NORTHING	Material	Interval(ft)	unit_code	U-233/234 pCi/g	U-235 pCi/g	U-238 pCi/g	Pu 239/240 pCi/g	Am-241 pCi/g	RFCA Tier I (Sum of Ratio)	RFCA Tier II (Sum of Ratio)
94998	20862398	749244	native 2	0.5-1.0	PCI/G	1.19	0.023	1.5	192	44.4	0.344	1.950
95098	2086447	749243	native 2	0.5-1.0	PCI/G	0.725	0.002	0.875	0.814	0.096	0.003	0.017
95198	2086149	749188	native 2	0.5-1.0	PCI/G	2.05	0.153	6.79	1820	406	3.176	17.985
95298	2086066	749123	native 2	0.5-1.0	PCI/G	0.855	0.077	1.06	37.6	8.42	0.068	0.387
95398	2086211	749120	native 2	0.5-1.0	PCI/G	1.63	0.087	5.07	683	136	1.121	6.347
95498	2086078	748987	native 2	0.45-0.9	PCI/G	1.2	0.047	2.97	669	170	1.265	7.163
95598	2086229	748984	native 2	0.5-1.0	PCI/G	0.905	0.029	1.24	412	89.5	0.707	4.006
95698	2086077	749248	native 2	0.5-1.0	PCI/G	0.412	0.018	0.397	1.9	0.329	0.004	0.022
95798	2086148	749268	native 2	0.5-1.0	PCI/G	1.18	0.108	1.2	3.98	0.768	0.010	0.056
95898	2086219	749244	native 2	0.5-1.0	PCI/G	0.905	0.049	0.896	15.8	3.16	0.028	0.160
97398	2086096	748827	native 2	0.5-1.0	PCI/G	0.933	0.063	1.06	4.5	0.72	0.009	0.053
97498	2086182	748770	native 2	0.45-0.9	PCI/G	1.09	0.127	1.01	0.489	0.082	0.004	0.023
97598	2086247	748845	native 2	0.5-1.0	PCI/G	0.9	0.118	1.87	389	72.5	0.614	3.478
90098	2085611	749212	native 3	2.0-2.5	PCI/G	0.746	0.026	0.853	0.006	-0.005	0.002	0.012
90198	2085686	749214	native 3	1.9-2.4	PCI/G	0.444	0.05	0.567	0.081	0.014	0.002	0.010
90298	2085761	749211	native 3	1.7-2.4	PCI/G	1.68	0.1	4	3.23	0.561	0.013	0.076
90398	2085835	749215	native 3	1.8-2.3	PCI/G	0.393	0.026	0.456	0.044	0.043	0.001	0.008
90498	2085910	749216	native 3	1.7-2.2	PCI/G	0.38	0.017	0.373	0.482	0.111	0.002	0.010
90598	2085610	749137	native 3	2.1-2.6	PCI/G	0.485	0.008	0.557	0.379	0.031	0.002	0.010
90698	2085685	749139	native 3	2.1-2.8	PCI/G	0.507	0.029	0.526	0.227	0.07	0.002	0.011
90798	2085760	749137	native 3	2.0-2.5	PCI/G	0.364	0.021	0.456	0.202	0.113	0.002	0.010
90898	2085835	749140	native 3	1.9-2.4	PCI/G	0.501	0.028	0.492	0.032	0.089	0.002	0.010
90998	2085910	749141	native 3	1.8-2.3	PCI/G	3.12	0.274	9.1	48.4	9.24	0.096	0.545
91098	2085610	749062	native 3	2.4-2.9	PCI/G	1.15	0.059	1.32	14.4	2.86	0.027	0.151
91198	2085685	749064	native 3	1.9-2.5	PCI/G	0.263	0.022	0.368	0.934	0.098	0.002	0.012
91298	2085760	749062	native 3	2.0-2.6	PCI/G	0.495	0.022	0.524	0.067	0.278	0.003	0.015
91398	2085834	749065	native 3	1.8-2.3	PCI/G	0.296	0.013	0.315	0.131	0.245	0.002	0.012
91498	2085909	749066	native 3	1.8-2.3	PCI/G	0.31	0.007	0.367	0.327	0.162	0.002	0.010
91598	2085610	748987	native 3	2.5-3.0	PCI/G	0.472	0.028	0.546	12.2	1.87	0.019	0.106
91698	2085684	748989	native 3	1.9-2.4	PCI/G	0.645	0.031	0.745	0.292	0.024	0.002	0.012
91798	2085759	748989	native 3	2.0-2.4	PCI/G	0.38	0.023	0.516	5.13	1.1	0.010	0.057
91898	2085834	748990	native 3	2.1-2.6	PCI/G	0.554	0.076	0.577	29.9	2.94	0.036	0.207
91998	2085909	748990	native 3	1.9-2.4	PCI/G	0.659	0.066	0.625	3.39	0.605	0.007	0.040
92098	2085609	748913	native 3	1.9-2.4	PCI/G	0.352	0.358	0.358	0.206	0.112	0.004	0.023
92198	2085684	748914	native 3	1.7-2.2	PCI/G	0.01	0.017	0.1	0.15	0.023	0.001	0.003
92298	2085760	748914	native 3	2.0-2.3	PCI/G	1.06	0.043	1.22	0.023	0.019	0.003	0.018

Borehole\_SORs

**Appendix E**  
**Borehole RFCA Tier I and Tier II RSAL Calculation Results**

Borehole	EASTING	NORTHING	Material	Interval(ft)	unit_code	U-233/234 pCi/g	U-235 pCi/g	U-238 pCi/g	Pu 239/240 pCi/g	Am-241 pCi/g	RFCA Tier I (Sum of Ratio)	RFCA Tier II (Sum of Ratio)
92398	2085834	748915	native 3	2.3-2.8	PCI/G	0.489	0.033	0.396	0.433	0.06	0.002	0.010
92498	2085909	748915	native 3	2.1-2.6	PCI/G	0.27	0.05	0.29	0.059	0.124	0.002	0.009
92598	2085560	749064	native 3	1.0-1.5	PCI/G	0.806	0.038	0.888	0.936	0.197	0.004	0.022
92698	2085551	748977	native 3	0.9-1.4	PCI/G	0.946	0.041	0.786	0.071	0.168	0.003	0.017
92798	2085553	748827	native 3	0.9-1.4	PCI/G	0.354	0.013	0.458	0.09	0.06	0.001	0.008
92898	2085703	748830	native 3	1.5-2.0	PCI/G	0.769	0.039	0.77	0.137	0.053	0.002	0.014
92998	2085853	748830	native 3	1.0-1.5	PCI/G	0.766	0.023	0.896	1.75	0.216	0.004	0.025
93098	2086005	748817	native 3	1.0-1.5	PCI/G	1.02	0.099	0.76	11.8	2.22	0.021	0.120
93198	2086167	748839	native 3	1.0-1.5	PCI/G	0.934	0.055	0.974	28	4.15	0.042	0.235
93298	2085755	748671	native 3	1.0-1.5	PCI/G	0.706	0.018	0.776	0.322	-0.012	0.002	0.012
93398	2085857	748698	native 3	1.0-1.5	PCI/G	1.2	0.07	1.14	5.46	0.818	0.011	0.061
93498	2086198	748702	native 3	1.0-1.5	PCI/G	0.823	0.064	1.15	5.55	1	0.011	0.065
93598	2085978	748977	native 3	0.8-1.2	PCI/G	0.556	0.003	0.632	3.64	0.447	0.006	0.034
93698	2086153	748988	native 3	1.0-1.5	PCI/G	0.372	0.012	0.401	54.1	8.39	0.078	0.441
93798	2086300	748976	native 3	0.9-1.35	PCI/G	0.367	0.04	0.308	0.154	0.097	0.002	0.009
93898	2086406	749003	native 3	1.0-1.5	PCI/G	0.761	0.049	0.776	17.4	3.21	0.029	0.166
93998	2086000	749123	native 3	1.0-1.5	PCI/G	0.544	0.042	0.655	0.058	0.047	0.002	0.011
94098	2086128	749117	native 3	0.8-1.2	PCI/G	0.671	0.036	0.769	19.2	2.96	0.029	0.165
94198	2086298	749123	native 3	0.8-1.2	PCI/G	0.316	0.017	0.341	0.346	0.059	0.001	0.008
94298	2086438	749112	native 3	1.0-1.5	PCI/G	0.696	0.05	0.738	0.278	0.164	0.003	0.017
94398	2085550	749129	native 3	0.7-1.1	PCI/G	0.677	0.042	0.713	0.257	0.048	0.002	0.013
94498	2085552	749264	native 3	0.8-1.3	PCI/G	0.423	0.025	0.468	0.058	0.027	0.001	0.008
94598	2085703	749265	native 3	1.0-1.5	PCI/G	0.636	0.025	0.567	1.04	0.165	0.003	0.017
94698	2085852	749265	native 3	0.9-1.35	PCI/G	0.568	0.04	0.617	2.1	0.415	0.005	0.029
94798	2086000	749266	native 3	1.0-1.5	PCI/G	0.588	0.037	0.512	0.521	0.245	0.003	0.017
94898	2086149	749243	native 3	0.8-1.2	PCI/G	1.48	0.124	3.12	247	54.4	0.433	2.452
94998	2086298	749244	native 3	1.0-1.5	PCI/G	0.843	0.017	1.22	26.6	4.56	0.043	0.241
95098	2086447	749243	native 3	1.0-1.5	PCI/G	0.426	0.023	0.618	1.52	0.311	0.004	0.023
95198	2086149	749188	native 3	1.0-1.5	PCI/G	1.29	0.138	2.71	115	25.8	0.207	1.172
95298	2086066	749123	native 3	1.0-1.5	PCI/G	0.956	0.037	0.944	45.1	8.92	0.075	0.428
95398	2086211	749120	native 3	1.0-1.5	PCI/G	0.841	0.062	1.19	46.5	8.89	0.077	0.435
95498	2086078	748987	native 3	0.9-1.35	PCI/G	0.827	0.063	1.76	156	29.5	0.250	1.418
95598	2086229	748984	native 3	1.0-1.5	PCI/G	0.489	0.015	0.572	38.1	5.93	0.056	0.315
95698	2086077	749248	native 3	1.0-1.5	PCI/G	0.544	0.009	0.622	10.7	2.07	0.019	0.105
95798	2086148	749268	native 3	1.0-1.5	PCI/G	0.562	-0.013	1.02	1.34	0.273	0.004	0.024
95898	2086219	749244	native 3	1.0-1.5	PCI/G	0.805	0.003	0.751	11.4	2.49	0.021	0.121



285

**Appendix E**  
**Borehole RFCA Tier I and Tier II RSAL Calculation Results**

Borehole	EASTING	NORTHING	Material	Interval(ft)	unit_code	U-233/234 pCi/g	U-235 pCi/g	U-238 pCi/g	Pu 239/240 pCi/g	Am-241 pCi/g	RFCA Tier I (Sum of Ratio)	RFCA Tier II (Sum of Ratio)
97398	2086096	748827	native 3	1.0-1.5	PCI/G	0.818	0.063	0.892	0.423	0.123	0.003	0.019
97498	2086182	748770	native 3	0.9-1.35	PCI/G	0.905	0.082	1.21	0.265	0.016	0.003	0.020
97598	2086247	748845	native 3	1.0-1.5	PCI/G	1.01	-0.007	1.23	33.2	5.5	0.051	0.291
90098	2085611	749212	native 4	2.5-3.0	PCI/G	0.592	0.041	0.515	0.016	-0.001	0.002	0.009
90198	2085686	749214	native 4	2.4-2.9	PCI/G	0.76	0.051	0.841	0.044	0.014	0.002	0.013
90298	2085761	749211	native 4	2.4-3.0	PCI/G	0.576	0.048	0.633	0.747	0.25	0.003	0.020
90398	2085835	749215	native 4	2.3-2.8	PCI/G	0.629	0.042	0.604	0.085	0.76	0.005	0.030
90498	2085910	749216	native 4	2.2-2.7	PCI/G	0.328	0.021	0.365	0.046	0.02	0.001	0.006
90598	2085610	749137	native 4	2.6-3.1	PCI/G	0.408	0.026	0.486	0.784	0.071	0.002	0.012
90798	2085760	749137	native 4	2.5-3.1	PCI/G	0.311	0.014	0.334	2.65	0.67	0.006	0.033
90898	2085835	749140	native 4	2.4-2.9	PCI/G	0.499	0.02	0.459	0.029	0.079	0.002	0.009
90998	2085910	749141	native 4	2.3-2.8	PCI/G	0.815	0.082	1.24	3.7	0.736	0.009	0.052
91098	2085610	749062	native 4	2.9-3.4	PCI/G	0.462	0.012	0.439	5.5	1.09	0.010	0.057
91198	2085685	749064	native 4	2.5-3.1	PCI/G	0.335	0.014	0.403	0.659	0.116	0.002	0.011
91398	2085834	749065	native 4	2.3-2.8	PCI/G	0.408	0.044	0.354	0.56	0.322	0.003	0.017
91498	2085909	749066	native 4	2.3-2.8	PCI/G	0.403	0.023	0.52	0.09	0.078	0.002	0.010
91598	2085610	748987	native 4	3.0-3.5	PCI/G	0.27	0.022	0.187	17.6	3.38	0.029	0.162
91698	2085684	748989	native 4	2.4-2.9	PCI/G	0.908	0.039	0.791	0.697	0.142	0.003	0.019
91898	2085834	748990	native 4	2.6-3.1	PCI/G	0.357	0.035	0.39	1.08	0.286	0.003	0.018
91998	2085909	748990	native 4	2.4-2.9	PCI/G	0.34	0.021	0.411	1.9	0.29	0.004	0.021
92098	2085609	748913	native 4	2.4-2.9	PCI/G	0.362	0.018	0.493	0.087	0.212	0.002	0.013
92198	2085684	748914	native 4	2.2-2.7	PCI/G	0.558	0.012	0.58	0.036	0.008	0.001	0.008
92398	2085834	748915	native 4	2.8-3.3	PCI/G	0.455	0.016	0.452	0.119	0.038	0.001	0.008
92498	2085909	748915	native 4	2.6-3.1	PCI/G	0.422	0.042	0.502	0.034	0.092	0.002	0.011
92598	2085560	749064	native 4	1.5-2.0	PCI/G	0.586	0.023	0.543	0.84	0.152	0.003	0.015
92698	2085551	748977	native 4	1.4-1.9	PCI/G	0.895	0.014	0.857	0.17	0.14	0.003	0.016
92798	2085553	748827	native 4	1.4-1.9	PCI/G	0.355	0.016	0.393	0.058	0.086	0.001	0.008
92898	2085703	748830	native 4	2.0-2.4	PCI/G	0.642	0.051	0.626	0.071	0.049	0.002	0.012
92998	2085853	748830	native 4	1.5-2.0	PCI/G	0.684	0.027	0.647	4.33	0.824	0.009	0.049
93098	2086005	748817	native 4	1.5-2.0	PCI/G	0.773	0	0.645	2.33	0.361	0.005	0.028
93198	2086167	748839	native 4	1.5-2.0	PCI/G	0.826	0.032	1.06	35.6	5.82	0.055	0.309
93298	2085755	748671	native 4	1.5-2.0	PCI/G	0.595	0.034	0.626	0.135	-0.045	0.002	0.009
93398	2085857	748698	native 4	1.5-2.0	PCI/G	1.32	0.102	1.13	0.073	-0.006	0.003	0.020
93498	2086198	748702	native 4	1.5-2.0	PCI/G	0.943	0.003	1.08	1.24	0.088	0.004	0.021
93598	2085978	748977	native 4	1.2-1.4	PCI/G	0.456	0.029	0.477	2.83	0.369	0.005	0.028
93698	2086153	748988	native 4	1.5-2.0	PCI/G	0.334	0.015	0.343	1.72	0.342	0.004	0.021

Borehole\_SORs

Appendix E  
Borehole RFCA Tier I and Tier II RSAL Calculation Results

Borehole	EASTING	NORTHING	Material	Interval(ft)	unit_code	U-233/234 pCi/g	U-235 pCi/g	U-238 pCi/g	Pu 239/240 pCi/g	Am-241 pCi/g	RFCA Tier I (Sum of Ratio)	RFCA Tier II (Sum of Ratio)
93798	2086300	748976	native 4	1.35-1.8	PCI/G	0.371	0.025	0.311	1.03	0.307	0.003	0.017
93898	2086406	749003	native 4	1.5-2.0	PCI/G	0.385	0.033	0.576	14.3	2.07	0.021	0.119
93998	2086000	749123	native 4	1.5-2.0	PCI/G	0.637	0.014	0.548	0.037	0.358	0.003	0.018
94098	2086128	749117	native 4	1.2-1.5	PCI/G	0.522	-0.047	1.11	54	5.25	0.064	0.363
94198	2086298	749123	native 4	1.2-1.6	PCI/G	0.464	0.017	0.36	2.86	0.293	0.004	0.025
94298	2086438	749112	native 4	1.5-2.0	PCI/G	0.686	0.034	0.773	0.471	0.026	0.002	0.014
94398	2085550	749129	native 4	1.1-1.4	PCI/G	0.668	0.032	0.702	0.267	0.024	0.002	0.012
94498	2085552	749264	native 4	1.3-1.8	PCI/G	0.37	0.047	0.449	0.014	0.019	0.001	0.008
94598	2085703	749265	native 4	1.5-2.0	PCI/G	0.802	0.043	0.813	0.081	0.032	0.002	0.013
94698	2085852	749265	native 4	1.35-1.8	PCI/G	0.651	0.055	0.878	5.62	1.16	0.012	0.066
94798	2086000	749266	native 4	1.5-2.0	PCI/G	0.483	0.016	0.611	0.121	0.051	0.002	0.010
94898	2086149	749243	native 4	1.2-1.7	PCI/G	0.946	0.079	1.97	34.5	7.63	0.064	0.363
94998	2086298	749244	native 4	1.5-2.0	PCI/G	0.491	0.048	0.685	6.95	1.33	0.013	0.073
95098	2086447	749243	native 4	1.5-2.0	PCI/G	0.652	0.062	0.664	0.57	0.152	0.003	0.017
95198	2086149	749188	native 4	1.5-2.0	PCI/G	0.523	0.031	0.716	5.32	0.969	0.010	0.057
95298	2086066	749123	native 4	1.5-2.0	PCI/G	0.562	0.023	0.595	1.31	0.238	0.004	0.020
95398	2086211	749120	native 4	1.5-2.0	PCI/G	0.713	0.032	0.813	34.5	6.66	0.057	0.324
95498	2086078	748987	native 4	1.35-1.75	PCI/G	0.52	0.034	0.593	12.3	2.26	0.021	0.117
95598	2086229	748984	native 4	1.5-2.0	PCI/G	0.359	-0.011	0.265	1.37	0.272	0.003	0.016
95698	2086077	749248	native 4	1.5-2.0	PCI/G	0.477	0.017	0.505	4.49	1.06	0.009	0.053
95798	2086148	749268	native 4	1.5-2.0	PCI/G	0.654	0.017	0.792	0.816	0.13	0.003	0.017
95898	2086219	749244	native 4	1.5-2.0	PCI/G	0.538	0.041	0.552	20.1	4.46	0.036	0.206
97398	2086096	748827	native 4	1.5-2.0	PCI/G	0.76	0.044	0.917	0.549	0.169	0.003	0.020
97498	2086182	748770	native 4	1.35-1.8	PCI/G	0.617	0.04	0.559	0	0.032	0.002	0.010
97598	2086247	748845	native 4	1.5-2.0	PCI/G	0.978	0.077	0.89	0.913	0.194	0.004	0.024



**Appendix E**  
**HPGe Tier I and Tier II RSAL Calculations**

STAKE NUMBER	Easting	Northing	95% UCL Tier I SOR (Fstat)	95% UCL Tier II SOR (Fstat)	Best Fit Tier I SOR	Best Fit Tier II SOR
STAKE 001	2086660.36	749529.79	0.16	0.93	0.04	0.24
STAKE 002	2086695.36	749530.93	0.18	1.02	0.06	0.34
STAKE 003	2086678.06	749501.13	0.16	0.93	0.04	0.24
STAKE 004	2086712.63	749504.23	0.19	1.08	0.07	0.42
STAKE 005	2086731.69	749533.84	0.17	0.98	0.05	0.30
STAKE 006	2086748.75	749506.28	0.20	1.14	0.09	0.49
STAKE 007	2086762.45	749535.74	0.19	1.08	0.07	0.42
STAKE 008	2086781.30	749506.72	0.21	1.19	0.10	0.54
STAKE 009	2086799.56	749538.23	0.20	1.14	0.09	0.49
STAKE 010	2086818.67	749508.67	0.21	1.21	0.10	0.56
STAKE 011	2086833.03	749539.60	0.19	1.05	0.07	0.38
STAKE 012	2086852.47	749510.94	0.21	1.17	0.09	0.52
STAKE 013	2086870.74	749541.20	0.20	1.12	0.08	0.46
STAKE 014	2086887.32	749514.29	0.22	1.24	0.11	0.60
STAKE 015	2086902.84	749545.88	0.21	1.17	0.09	0.53
STAKE 016	2086920.38	749517.65	0.21	1.21	0.10	0.57
STAKE 017	2086937.28	749548.87	0.18	1.04	0.06	0.37
STAKE 018	2086956.59	749519.03	0.20	1.16	0.09	0.51
STAKE 019	2086975.17	749548.25	0.19	1.07	0.07	0.40
STAKE 020	2086991.16	749523.05	0.20	1.12	0.08	0.46
STAKE 021	2087006.84	749551.73	0.19	1.09	0.08	0.43
STAKE 022	2087025.48	749523.74	0.20	1.16	0.09	0.50
STAKE 023	2087040.76	749553.56	0.20	1.13	0.08	0.47
STAKE 024	2087060.79	749527.84	0.21	1.22	0.10	0.58
STAKE 025	2087074.45	749557.95	0.19	1.07	0.07	0.41
STAKE 026	2087094.45	749529.46	0.19	1.09	0.08	0.43
STAKE 027	2087112.06	749557.07	0.18	1.02	0.06	0.35
STAKE 028	2087128.65	749532.50	0.17	0.98	0.05	0.29
STAKE 029	2087145.52	749562.17	0.19	1.08	0.07	0.41
STAKE 030	2087180.07	749564.78	0.17	0.95	0.05	0.26
STAKE 031	2087045.63	749494.74	0.17	0.95	0.05	0.26
STAKE 032	2087011.42	749491.93	0.23	1.30	0.12	0.67
STAKE 033	2086976.64	749489.91	0.24	1.38	0.14	0.77
STAKE 034	2086940.34	749488.57	0.24	1.34	0.13	0.72
STAKE 035	2086907.58	749485.31	0.24	1.33	0.13	0.71
STAKE 036	2086873.63	749483.37	0.25	1.40	0.14	0.79
STAKE 037	2086838.28	749480.70	0.22	1.26	0.11	0.63
STAKE 038	2086802.35	749478.14	0.23	1.29	0.12	0.66
STAKE 039	2086768.76	749475.99	0.21	1.19	0.10	0.54
STAKE 040	2086733.01	749474.44	0.17	0.97	0.05	0.28
STAKE 041	2086699.40	749471.91	0.17	0.94	0.04	0.25
STAKE 043	2086685.15	749441.65	0.24	1.34	0.13	0.72
STAKE 044	2086719.39	749444.02	0.23	1.32	0.12	0.69
STAKE 045	2086752.83	749445.04	0.24	1.36	0.13	0.74
STAKE 046	2086789.28	749447.22	0.28	1.58	0.17	0.99
STAKE 047	2086822.32	749449.26	0.24	1.35	0.13	0.73
STAKE 048	2086858.28	749451.80	0.33	1.87	0.23	1.31

**Appendix E**  
**HPGe Tier I and Tier II RSAL Calculations**

STAKE NUMBER	Easting	Northing	95% UCL Tier I SOR (Fstat)	95% UCL Tier II SOR (Fstat)	Best Fit Tier I SOR	Best Fit Tier II SOR
STAKE 049	2086892.23	749454.60	0.34	1.93	0.24	1.38
STAKE 050	2086923.40	749457.06	0.26	1.47	0.15	0.87
STAKE 051	2086958.26	749461.00	0.21	1.17	0.09	0.52
STAKE 052	2086874.82	749423.55	0.17	0.94	0.04	0.25
STAKE 053	2086839.57	749421.81	0.17	0.95	0.05	0.26
STAKE 054	2086803.25	749419.29	0.20	1.11	0.08	0.45
STAKE 055	2086684.68	749285.06	0.17	0.94	0.04	0.25
STAKE 056	2086716.93	749291.14	0.17	0.99	0.05	0.31
STAKE 057	2086752.10	749296.60	0.17	0.95	0.05	0.26
STAKE 058	2086786.96	749306.10	0.18	1.01	0.06	0.33
STAKE 059	2086821.82	749313.17	0.19	1.06	0.07	0.39
STAKE 060	2086856.06	749321.03	0.21	1.19	0.10	0.55
STAKE 061	2086887.41	749330.03	0.24	1.35	0.13	0.73
STAKE 062	2086919.87	749342.42	0.22	1.23	0.10	0.58
STAKE 063	2086948.78	749356.80	0.19	1.10	0.08	0.44
STAKE 064	2086981.45	749367.50	0.23	1.33	0.12	0.70
STAKE 065	2087013.46	749380.54	0.22	1.25	0.11	0.61
STAKE 066	2087044.99	749396.39	0.22	1.23	0.10	0.59
STAKE 067	2086650.05	749284.89	0.17	0.94	0.04	0.24
STAKE 068	2086616.24	749277.98	0.17	0.98	0.05	0.29
STAKE 069	2086580.76	749276.90	0.17	0.95	0.05	0.26
STAKE 070	2086547.39	749274.78	0.17	0.94	0.04	0.25
STAKE 071	2086434.71	748842.45	0.17	0.96	0.05	0.27
STAKE 072	2086465.63	748834.52	0.16	0.93	0.04	0.24
STAKE 073	2086499.39	748825.22	0.17	0.96	0.05	0.27
STAKE 074	2086533.69	748821.30	0.17	0.99	0.05	0.30
STAKE 075	2086567.57	748816.22	0.17	0.96	0.05	0.27
STAKE 076	2086602.13	748813.37	0.19	1.07	0.07	0.40
STAKE 077	2086444.59	748809.31	0.24	1.35	0.13	0.73
STAKE 078	2086475.62	748799.30	0.37	2.11	0.28	1.57
STAKE 079	2086511.98	748793.81	0.39	2.20	0.29	1.66
STAKE 080	2086547.46	748787.77	0.35	1.96	0.25	1.41
STAKE 081	2086581.44	748786.52	0.45	2.56	0.36	2.04
STAKE 082	2086615.42	748782.25	0.42	2.38	0.33	1.85
STAKE 083	2086636.75	748807.55	0.23	1.31	0.12	0.68
STAKE 084	2086650.32	748778.60	0.32	1.81	0.22	1.24
STAKE 085	2086671.08	748803.76	0.22	1.25	0.11	0.61
STAKE 086	2086682.40	748772.89	0.32	1.83	0.22	1.26
STAKE 087	2086706.10	748797.99	0.25	1.39	0.14	0.77
STAKE 088	2086718.18	748767.45	0.32	1.83	0.22	1.27
STAKE 089	2086742.98	748793.02	0.21	1.20	0.10	0.55
STAKE 090	2086755.46	748763.43	0.30	1.72	0.20	1.15
STAKE 091	2086775.50	748788.98	0.20	1.13	0.08	0.46
STAKE 092	2086788.19	748758.40	0.28	1.60	0.18	1.01
STAKE 093	2086812.24	748784.51	0.17	0.99	0.05	0.30
STAKE 094	2086821.86	748753.48	0.30	1.70	0.20	1.12
STAKE 095	2086843.65	748778.67	0.17	0.99	0.05	0.30

**Appendix E**  
**HPGe Tier I and Tier II RSAL Calculations**

STAKE NUMBER	Easting	Northing	95% UCL Tier I SOR (Fstat)	95% UCL Tier II SOR (Fstat)	Best Fit Tier I SOR	Best Fit Tier II SOR
STAKE 096	2086857.89	748751.00	0.26	1.47	0.15	0.86
STAKE 097	2086891.87	748743.80	0.22	1.25	0.11	0.61
STAKE 098	2086452.32	748776.10	0.51	2.91	0.42	2.40
STAKE 099	2086430.55	748749.91	0.50	2.85	0.41	2.34
STAKE 100	2086467.37	748745.06	0.36	2.07	0.27	1.52
STAKE 1000	2085697.36	748598.99	0.16	0.93	0.04	0.23
STAKE 1001	2085713.42	748568.92	0.18	1.00	0.06	0.31
STAKE 1002	2085666.30	748594.46	0.17	0.95	0.05	0.26
STAKE 1003	2085682.74	748566.45	0.17	0.95	0.05	0.26
STAKE 1004	2085630.39	748595.03	0.17	0.95	0.05	0.26
STAKE 1005	2085646.16	748567.72	0.17	0.93	0.04	0.24
STAKE 1006	2085596.99	748594.99	0.17	0.95	0.05	0.26
STAKE 1007	2085614.36	748566.83	0.17	0.94	0.04	0.25
STAKE 1008	2086111.37	748894.07	0.51	2.91	0.42	2.40
STAKE 1009	2086142.52	748893.35	0.26	1.49	0.16	0.89
STAKE 101	2086487.41	748769.45	0.35	1.99	0.25	1.44
STAKE 1010	2086124.81	748865.08	0.23	1.33	0.12	0.70
STAKE 1011	2086157.18	748865.81	0.24	1.34	0.13	0.72
STAKE 1012	2085795.06	748647.80	0.19	1.10	0.08	0.43
STAKE 1013	2085761.62	748642.77	0.17	0.97	0.05	0.29
STAKE 1014	2085723.41	748644.14	0.17	0.96	0.05	0.28
STAKE 1015	2085708.41	748673.78	0.19	1.06	0.07	0.39
STAKE 1016	2085739.45	748668.02	0.21	1.16	0.09	0.51
STAKE 1017	2085769.72	748672.11	0.16	0.93	0.04	0.24
STAKE 1018	2085792.01	748696.51	0.25	1.42	0.14	0.81
STAKE 1019	2085826.30	748700.00	0.40	2.29	0.31	1.76
STAKE 102	2086501.74	748741.81	0.40	2.27	0.31	1.74
STAKE 1020	2085858.72	748697.42	0.20	1.11	0.08	0.45
STAKE 1021	2085881.61	748720.15	0.28	1.58	0.17	0.99
STAKE 1022	2085893.14	748754.69	0.19	1.07	0.07	0.40
STAKE 1023	2085811.84	748619.41	0.22	1.25	0.10	0.59
STAKE 1024	2085778.11	748615.87	0.18	1.02	0.06	0.34
STAKE 1025	2086290.76	748451.14	0.26	1.44	0.15	0.84
STAKE 1026	2087595.12	748909.50	0.17	0.95	0.05	0.26
STAKE 1027	2087575.61	748843.79	0.17	0.94	0.04	0.24
STAKE 1028	2087554.62	748862.84	0.17	0.95	0.05	0.26
STAKE 1029	2087501.95	748883.76	0.24	1.34	0.13	0.72
STAKE 103	2086525.16	748762.93	0.45	2.52	0.35	2.01
STAKE 1030	2087545.46	748832.99	0.17	0.94	0.04	0.25
STAKE 1031	2087508.70	748828.46	0.22	1.26	0.11	0.62
STAKE 1032	2087410.40	748801.87	0.23	1.32	0.12	0.70
STAKE 1033	2087399.69	748833.89	0.24	1.36	0.13	0.74
STAKE 1034	2087380.84	748807.91	0.20	1.14	0.09	0.48
STAKE 1035	2087370.15	748833.22	0.21	1.21	0.10	0.56
STAKE 1036	2087437.88	748851.90	0.23	1.29	0.12	0.66
STAKE 1037	2087145.40	748944.46	0.17	0.97	0.05	0.28
STAKE 1038	2087122.73	748942.19	0.23	1.29	0.12	0.66

**Appendix E**  
**HPGe Tier I and Tier II RSAL Calculations**

STAKE NUMBER	Easting	Northing	95% UCL Tier I SOR (Fstat)	95% UCL Tier II SOR (Fstat)	Best Fit Tier I SOR	Best Fit Tier II SOR
STAKE 1039	2087139.33	748922.05	0.18	1.01	0.06	0.34
STAKE 104	2086540.73	748734.16	0.30	1.72	0.20	1.15
STAKE 1040	2087113.25	748909.62	0.18	1.04	0.07	0.37
STAKE 1041	2087064.10	748811.65	0.18	0.99	0.05	0.31
STAKE 1042	2087066.33	748782.26	0.17	0.99	0.05	0.30
STAKE 1043	2087043.78	748794.50	0.17	0.98	0.05	0.29
STAKE 1044	2087012.33	748790.49	0.17	0.97	0.05	0.28
STAKE 1045	2087034.88	748761.91	0.17	0.94	0.04	0.25
STAKE 1046	2087009.01	748757.54	0.17	0.96	0.05	0.27
STAKE 1047	2086985.72	748775.12	0.17	0.96	0.05	0.27
STAKE 1048	2086983.38	748748.37	0.17	0.97	0.05	0.28
STAKE 1049	2086958.42	748764.99	0.17	0.96	0.05	0.27
STAKE 105	2086561.54	748756.44	0.38	2.18	0.29	1.64
STAKE 1050	2086936.95	748759.90	0.17	0.96	0.05	0.27
STAKE 1051	2086967.48	748789.43	0.18	1.04	0.07	0.37
STAKE 1052	2086944.97	748784.83	0.25	1.39	0.14	0.77
STAKE 1053	2086985.62	748804.36	0.17	0.94	0.04	0.25
STAKE 1054	2087013.27	748807.72	0.17	0.98	0.05	0.30
STAKE 1055	2087419.52	749317.34	0.23	1.28	0.11	0.65
STAKE 1056	2087478.98	749229.91	0.26	1.50	0.16	0.90
STAKE 1057	2087512.58	749232.28	0.23	1.31	0.12	0.68
STAKE 1058	2087463.14	749198.06	0.17	0.97	0.05	0.28
STAKE 1059	2087497.51	749199.80	0.17	0.95	0.05	0.26
STAKE 106	2086577.33	748729.36	0.34	1.94	0.24	1.38
STAKE 1060	2087545.02	749234.62	0.24	1.38	0.13	0.76
STAKE 1061	2087534.13	749204.52	0.29	1.66	0.19	1.08
STAKE 1062	2087518.74	749171.72	0.18	0.99	0.05	0.31
STAKE 1063	2087566.74	749205.12	0.27	1.54	0.17	0.95
STAKE 1064	2087554.35	749177.38	0.27	1.53	0.17	0.94
STAKE 1065	2087585.29	749178.11	0.20	1.13	0.08	0.47
STAKE 1066	2087601.08	749207.17	0.17	0.96	0.05	0.27
STAKE 1067	2087634.88	749209.87	0.17	0.96	0.05	0.27
STAKE 1068	2087579.57	749236.50	0.19	1.09	0.08	0.43
STAKE 1069	2087619.57	749181.17	0.17	0.94	0.04	0.25
STAKE 107	2086596.90	748755.86	0.32	1.83	0.22	1.27
STAKE 1070	2087590.85	749270.42	0.17	0.96	0.05	0.27
STAKE 1071	2087612.18	749240.67	0.17	0.97	0.05	0.28
STAKE 1072	2087603.61	749154.03	0.17	0.94	0.04	0.25
STAKE 1073	2087558.80	749266.95	0.23	1.29	0.12	0.66
STAKE 1074	2087573.60	749152.54	0.17	0.95	0.05	0.27
STAKE 1075	2087524.83	749264.79	0.22	1.27	0.11	0.63
STAKE 1076	2087504.75	749291.60	0.25	1.40	0.14	0.79
STAKE 1077	2087539.89	749146.71	0.17	0.95	0.05	0.27
STAKE 1078	2087506.15	749141.11	0.17	0.96	0.05	0.27
STAKE 1079	2087592.18	749126.36	0.17	0.94	0.04	0.25
STAKE 108	2086609.40	748724.35	0.33	1.84	0.23	1.28
STAKE 1080	2086738.52	749415.43	0.18	1.03	0.06	0.35

**Appendix E**  
**HPGe Tier I and Tier II RSAL Calculations**

STAKE NUMBER	Easting	Northing	95% UCL Tier I SOR (Fstat)	95% UCL Tier II SOR (Fstat)	Best Fit Tier I SOR	Best Fit Tier II SOR
STAKE 1081	2086770.51	749416.66	0.17	0.95	0.04	0.25
STAKE 1082	2086755.47	749388.07	0.17	0.94	0.04	0.25
STAKE 1083	2086784.55	749386.97	0.17	0.96	0.05	0.27
STAKE 1084	2086823.55	749395.37	0.17	0.94	0.04	0.24
STAKE 1085	2086855.28	749399.38	0.17	0.96	0.05	0.27
STAKE 1086	2086911.26	749426.41	0.16	0.93	0.04	0.24
STAKE 1087	2086941.10	749429.38	0.17	0.96	0.05	0.27
STAKE 1088	2086977.99	749442.76	0.16	0.93	0.04	0.24
STAKE 1089	2086993.98	749463.40	0.17	0.99	0.05	0.31
STAKE 109	2086630.58	748750.48	0.29	1.65	0.19	1.06
STAKE 1090	2087044.51	749394.52	0.22	1.25	0.11	0.61
STAKE 1091	2087074.85	749413.45	0.26	1.48	0.15	0.88
STAKE 1092	2087105.01	749427.89	0.19	1.05	0.07	0.38
STAKE 1093	2087135.90	749446.25	0.20	1.12	0.08	0.47
STAKE 1094	2087166.38	749463.61	0.18	1.01	0.06	0.33
STAKE 1095	2087193.79	749482.13	0.17	0.94	0.04	0.25
STAKE 1096	2087225.89	749500.92	0.18	1.00	0.06	0.32
STAKE 1097	2087255.01	749520.72	0.17	0.96	0.05	0.27
STAKE 1098	2087562.21	749114.89	0.16	0.93	0.04	0.23
STAKE 1099	2086602.30	749205.91	0.36	2.02	0.26	1.47
STAKE 110	2086642.37	748719.75	0.31	1.75	0.21	1.18
STAKE 1100	2086591.90	749178.98	0.28	1.57	0.17	0.98
STAKE 1101	2086569.87	749203.17	0.17	0.96	0.05	0.27
STAKE 1102	2086560.45	749176.37	0.17	0.94	0.04	0.25
STAKE 1103	2086577.43	749146.63	0.27	1.55	0.17	0.96
STAKE 1104	2086551.62	749145.33	0.19	1.09	0.08	0.43
STAKE 1105	2086521.59	749021.23	0.56	3.19	0.47	2.68
STAKE 1106	2086516.42	749271.95	0.16	0.93	0.04	0.23
STAKE 1107	2086516.09	749240.76	0.17	0.94	0.04	0.25
STAKE 1108	2086515.92	749205.28	0.16	0.93	0.04	0.24
STAKE 1109	2086512.60	749174.27	0.35	1.98	0.25	1.43
STAKE 111	2086664.44	748744.49	0.28	1.61	0.18	1.02
STAKE 1110	2086511.44	749138.34	0.35	1.97	0.25	1.42
STAKE 1111	2086508.84	749107.28	0.40	2.27	0.31	1.74
STAKE 112	2086677.81	748714.94	0.31	1.75	0.21	1.18
STAKE 113	2086697.38	748740.33	0.30	1.70	0.20	1.12
STAKE 114	2086708.47	748710.68	0.28	1.56	0.17	0.96
STAKE 115	2086731.98	748735.66	0.29	1.66	0.19	1.08
STAKE 116	2086744.07	748704.69	0.29	1.65	0.19	1.07
STAKE 117	2086763.71	748729.33	0.26	1.50	0.16	0.90
STAKE 118	2086777.42	748697.75	0.27	1.54	0.17	0.95
STAKE 119	2086795.34	748724.26	0.27	1.50	0.16	0.90
STAKE 120	2086814.91	748696.05	0.26	1.46	0.15	0.86
STAKE 121	2086856.24	748655.22	0.29	1.63	0.19	1.05
STAKE 122	2086836.31	748630.65	0.26	1.50	0.16	0.89
STAKE 123	2086824.56	748663.22	0.25	1.44	0.15	0.83
STAKE 124	2086804.70	748637.80	0.27	1.51	0.16	0.90

**Appendix E**  
**HPGe Tier I and Tier II RSAL Calculations**

STAKE NUMBER	Easting	Northing	95% UCL Tier I SOR (Fstat)	95% UCL Tier II SOR (Fstat)	Best Fit Tier I SOR	Best Fit Tier II SOR
STAKE 125	2086792.43	748669.64	0.27	1.54	0.17	0.95
STAKE 126	2086769.71	748641.09	0.26	1.47	0.15	0.86
STAKE 127	2086756.52	748672.93	0.27	1.54	0.17	0.95
STAKE 128	2086733.39	748648.35	0.29	1.67	0.19	1.09
STAKE 129	2086724.01	748670.71	0.28	1.59	0.18	1.00
STAKE 130	2086704.21	748651.68	0.30	1.69	0.20	1.11
STAKE 131	2086693.21	748680.85	0.26	1.46	0.15	0.86
STAKE 132	2086663.84	748663.05	0.22	1.25	0.11	0.61
STAKE 133	2086654.82	748689.43	0.32	1.79	0.22	1.23
STAKE 134	2086634.72	748659.43	0.35	1.96	0.25	1.40
STAKE 135	2086621.87	748692.32	0.34	1.91	0.24	1.35
STAKE 136	2086601.48	748663.84	0.24	1.37	0.13	0.75
STAKE 137	2086586.72	748694.81	0.33	1.87	0.23	1.31
STAKE 138	2086567.49	748671.19	0.25	1.41	0.14	0.80
STAKE 139	2086554.53	748700.16	0.35	2.00	0.26	1.45
STAKE 140	2086534.72	748675.28	0.31	1.78	0.21	1.21
STAKE 141	2086519.26	748704.71	0.36	2.05	0.27	1.51
STAKE 142	2086491.54	748681.27	0.32	1.82	0.22	1.26
STAKE 143	2086475.73	748712.73	0.45	2.53	0.36	2.02
STAKE 144	2086456.25	748686.66	0.28	1.60	0.18	1.01
STAKE 145	2086443.58	748717.76	0.46	2.60	0.37	2.09
STAKE 146	2086423.15	748693.14	0.37	2.09	0.27	1.55
STAKE 147	2086410.48	748721.88	0.47	2.65	0.38	2.14
STAKE 148	2086390.78	748696.45	0.39	2.21	0.30	1.67
STAKE 149	2086380.12	748639.92	0.34	1.94	0.24	1.39
STAKE 150	2086400.89	748664.61	0.41	2.31	0.32	1.78
STAKE 1500	2086364.84	748671.85	0.41	2.35	0.32	1.82
STAKE 151	2086412.82	748635.10	0.45	2.55	0.36	2.03
STAKE 152	2086432.75	748657.62	0.36	2.04	0.26	1.49
STAKE 153	2086445.69	748627.70	0.43	2.42	0.33	1.89
STAKE 154	2086464.72	748652.36	0.29	1.67	0.19	1.09
STAKE 155	2086478.07	748623.14	0.34	1.94	0.24	1.39
STAKE 156	2086499.60	748646.91	0.31	1.78	0.21	1.21
STAKE 157	2086517.62	748617.20	0.30	1.70	0.20	1.12
STAKE 158	2086541.86	748641.85	0.27	1.52	0.16	0.92
STAKE 159	2086553.01	748612.42	0.31	1.78	0.21	1.21
STAKE 160	2086578.20	748634.30	0.26	1.49	0.16	0.89
STAKE 161	2086595.25	748606.49	0.25	1.41	0.14	0.80
STAKE 162	2086613.32	748633.70	0.36	2.03	0.26	1.48
STAKE 163	2086627.58	748601.76	0.22	1.24	0.11	0.60
STAKE 164	2086645.19	748626.16	0.24	1.38	0.13	0.76
STAKE 165	2086658.71	748597.83	0.22	1.26	0.11	0.62
STAKE 166	2086679.99	748625.22	0.27	1.56	0.17	0.96
STAKE 167	2086690.25	748595.17	0.28	1.58	0.17	0.99
STAKE 168	2086712.71	748621.30	0.26	1.45	0.15	0.84
STAKE 169	2086724.99	748587.90	0.25	1.40	0.14	0.79
STAKE 170	2086745.60	748613.41	0.26	1.46	0.15	0.85

**Appendix E**  
**HPGe Tier I and Tier II RSAL Calculations**

STAKE NUMBER	Easting	Northing	95% UCL Tier I SOR (Fstat)	95% UCL Tier II SOR (Fstat)	Best Fit Tier I SOR	Best Fit Tier II SOR
STAKE 171	2086350.85	748643.12	0.38	2.15	0.28	1.61
STAKE 172	2086356.14	748611.69	0.47	2.64	0.38	2.13
STAKE 173	2086390.94	748606.28	0.39	2.23	0.30	1.70
STAKE 174	2086367.98	748580.79	0.36	2.06	0.27	1.51
STAKE 175	2086421.24	748599.38	0.32	1.81	0.22	1.25
STAKE 176	2086400.82	748574.15	0.33	1.87	0.23	1.31
STAKE 177	2086455.63	748595.63	0.26	1.47	0.15	0.86
STAKE 178	2086437.16	748569.19	0.36	2.01	0.26	1.47
STAKE 179	2086493.66	748591.13	0.27	1.53	0.16	0.93
STAKE 180	2086469.78	748566.54	0.31	1.78	0.21	1.21
STAKE 181	2086531.10	748585.80	0.29	1.67	0.19	1.09
STAKE 182	2086508.41	748560.72	0.31	1.76	0.21	1.18
STAKE 183	2086569.35	748579.76	0.26	1.46	0.15	0.85
STAKE 184	2086546.33	748555.32	0.30	1.69	0.20	1.11
STAKE 185	2086603.84	748573.74	0.27	1.53	0.16	0.93
STAKE 186	2086582.46	748549.05	0.30	1.72	0.20	1.15
STAKE 187	2086637.59	748569.79	0.27	1.53	0.16	0.93
STAKE 188	2086617.93	748543.50	0.29	1.64	0.19	1.06
STAKE 189	2086667.82	748563.32	0.26	1.46	0.15	0.85
STAKE 190	2086648.93	748538.99	0.29	1.67	0.19	1.09
STAKE 191	2086709.45	748560.24	0.23	1.28	0.12	0.65
STAKE 192	2086687.56	748530.22	0.31	1.73	0.20	1.16
STAKE 193	2086740.61	748555.52	0.26	1.50	0.16	0.90
STAKE 194	2086720.40	748524.01	0.24	1.36	0.13	0.74
STAKE 195	2086801.36	748492.80	0.26	1.47	0.15	0.86
STAKE 196	2086754.60	748525.70	0.26	1.49	0.16	0.89
STAKE 197	2086781.66	748464.81	0.22	1.27	0.11	0.63
STAKE 198	2086786.01	748520.88	0.25	1.41	0.14	0.80
STAKE 199	2086766.64	748495.40	0.22	1.26	0.11	0.62
STAKE 200	2086748.92	748471.76	0.23	1.32	0.12	0.69
STAKE 201	2086734.51	748501.66	0.26	1.45	0.15	0.84
STAKE 202	2086711.99	748473.46	0.24	1.37	0.13	0.76
STAKE 203	2086698.80	748503.18	0.24	1.39	0.14	0.77
STAKE 204	2086676.08	748478.46	0.23	1.28	0.11	0.65
STAKE 205	2086660.95	748509.58	0.24	1.35	0.13	0.73
STAKE 206	2086642.53	748484.44	0.23	1.29	0.12	0.66
STAKE 207	2086631.19	748515.07	0.27	1.53	0.16	0.93
STAKE 208	2086606.07	748490.01	0.23	1.30	0.12	0.67
STAKE 209	2086594.29	748523.82	0.27	1.52	0.16	0.92
STAKE 210	2086571.30	748498.04	0.25	1.42	0.14	0.80
STAKE 211	2086558.34	748524.58	0.30	1.70	0.20	1.12
STAKE 212	2086538.60	748497.69	0.26	1.45	0.15	0.85
STAKE 213	2086523.59	748529.09	0.27	1.54	0.17	0.94
STAKE 214	2086499.53	748505.28	0.27	1.52	0.16	0.92
STAKE 215	2086488.24	748536.68	0.26	1.50	0.16	0.90
STAKE 216	2086464.48	748510.56	0.27	1.51	0.16	0.91
STAKE 217	2086451.21	748540.03	0.32	1.81	0.22	1.24

**Appendix E**  
**HPGe Tier I and Tier II RSAL Calculations**

STAKE NUMBER	Easting	Northing	95% UCL Tier I SOR (Fstat)	95% UCL Tier II SOR (Fstat)	Best Fit Tier I SOR	Best Fit Tier II SOR
STAKE 218	2086430.95	748517.52	0.25	1.42	0.14	0.81
STAKE 219	2086417.75	748546.44	0.33	1.87	0.23	1.31
STAKE 220	2086396.77	748522.21	0.29	1.62	0.18	1.03
STAKE 221	2086381.98	748549.21	0.29	1.65	0.19	1.07
STAKE 222	2086363.55	748528.29	0.35	1.98	0.25	1.43
STAKE 223	2086348.43	748553.61	0.34	1.95	0.25	1.39
STAKE 224	2086327.97	748530.60	0.30	1.72	0.20	1.14
STAKE 225	2086341.61	748498.88	0.25	1.40	0.14	0.78
STAKE 226	2086315.63	748476.13	0.32	1.80	0.22	1.23
STAKE 227	2086371.44	748492.94	0.26	1.48	0.15	0.88
STAKE 228	2086352.06	748469.59	0.31	1.76	0.21	1.18
STAKE 229	2086407.40	748487.92	0.24	1.39	0.14	0.77
STAKE 230	2086389.04	748463.54	0.29	1.62	0.18	1.03
STAKE 231	2086440.16	748481.70	0.23	1.33	0.12	0.70
STAKE 232	2086420.64	748459.84	0.31	1.73	0.20	1.15
STAKE 233	2086475.81	748476.95	0.25	1.39	0.14	0.78
STAKE 234	2086455.12	748452.92	0.31	1.75	0.21	1.17
STAKE 235	2086510.54	748471.34	0.22	1.25	0.11	0.62
STAKE 236	2086490.24	748446.44	0.27	1.52	0.16	0.91
STAKE 237	2086547.64	748465.17	0.23	1.30	0.12	0.67
STAKE 238	2086525.82	748440.49	0.23	1.29	0.12	0.66
STAKE 239	2086583.99	748459.24	0.25	1.40	0.14	0.79
STAKE 240	2086558.71	748434.87	0.21	1.21	0.10	0.57
STAKE 241	2086325.85	748443.66	0.25	1.44	0.15	0.83
STAKE 242	2086305.90	748419.78	0.23	1.29	0.12	0.66
STAKE 243	2086362.36	748437.36	0.23	1.30	0.12	0.67
STAKE 244	2086339.62	748412.50	0.21	1.21	0.10	0.57
STAKE 245	2086395.59	748428.72	0.23	1.32	0.12	0.70
STAKE 246	2086372.84	748405.92	0.24	1.38	0.14	0.77
STAKE 247	2086321.04	748618.41	0.17	0.96	0.05	0.27
STAKE 248	2086289.16	748624.09	0.40	2.26	0.31	1.73
STAKE 249	2086328.12	748586.97	0.35	2.00	0.26	1.45
STAKE 250	2086298.73	748592.70	0.18	0.99	0.05	0.31
STAKE 251	2086310.07	748559.86	0.18	1.05	0.07	0.38
STAKE 252	2086278.63	748568.90	0.32	1.81	0.22	1.24
STAKE 253	2086266.92	748598.99	0.35	1.97	0.25	1.42
STAKE 254	2086244.80	748575.98	0.37	2.07	0.27	1.53
STAKE 255	2086286.39	748534.74	0.17	0.96	0.05	0.27
STAKE 256	2086255.54	748540.91	0.32	1.84	0.22	1.27
STAKE 257	2086296.31	748508.52	0.18	1.03	0.06	0.35
STAKE 258	2086262.86	748518.09	0.22	1.26	0.11	0.62
STAKE 260	2086616.82	749237.79	0.18	1.02	0.06	0.34
STAKE 261	2086636.56	749211.02	0.18	1.00	0.06	0.31
STAKE 262	2086650.05	749240.27	0.23	1.32	0.12	0.69
STAKE 263	2086671.01	749214.02	0.50	2.82	0.41	2.31
STAKE 264	2086682.78	749244.98	0.21	1.20	0.10	0.55
STAKE 265	2086703.63	749219.19	0.58	3.27	0.49	2.76



**Appendix E**  
**HPGe Tier I and Tier II RSAL Calculations**

STAKE NUMBER	Easting	Northing	95% UCL Tier I SOR (Fstat)	95% UCL Tier II SOR (Fstat)	Best Fit Tier I SOR	Best Fit Tier II SOR
STAKE 266	2086716.98	749249.52	0.25	1.40	0.14	0.79
STAKE 267	2086739.55	749225.96	0.35	1.99	0.25	1.44
STAKE 268	2086752.96	749254.54	0.37	2.11	0.28	1.57
STAKE 269	2086772.11	749230.15	0.48	2.70	0.39	2.19
STAKE 270	2086786.46	749258.83	0.40	2.25	0.30	1.72
STAKE 271	2086806.05	749233.85	0.55	3.11	0.46	2.60
STAKE 272	2086822.59	749264.51	0.35	1.97	0.25	1.42
STAKE 273	2086839.84	749239.81	0.49	2.76	0.40	2.25
STAKE 274	2086853.65	749268.88	0.43	2.42	0.34	1.90
STAKE 275	2086872.48	749243.17	0.45	2.56	0.36	2.05
STAKE 276	2086887.80	749272.81	0.35	1.99	0.26	1.45
STAKE 277	2086908.24	749248.77	0.38	2.15	0.28	1.61
STAKE 278	2086922.89	749277.76	0.32	1.81	0.22	1.24
STAKE 279	2086941.51	749252.38	0.31	1.76	0.21	1.19
STAKE 280	2086954.61	749282.82	0.31	1.76	0.21	1.19
STAKE 281	2086976.58	749257.58	0.28	1.61	0.18	1.02
STAKE 282	2086989.36	749289.10	0.27	1.53	0.16	0.93
STAKE 283	2087008.94	749260.27	0.30	1.68	0.19	1.10
STAKE 284	2087022.76	749291.23	0.31	1.77	0.21	1.20
STAKE 285	2087043.96	749264.07	0.29	1.64	0.19	1.06
STAKE 286	2087058.62	749295.66	0.30	1.68	0.19	1.10
STAKE 287	2087077.41	749269.69	0.29	1.66	0.19	1.07
STAKE 288	2087090.31	749300.35	0.25	1.41	0.14	0.79
STAKE 289	2087111.64	749272.84	0.25	1.41	0.14	0.80
STAKE 290	2087124.34	749303.89	0.26	1.47	0.15	0.87
STAKE 291	2087144.98	749278.13	0.31	1.77	0.21	1.20
STAKE 292	2087156.34	749308.92	0.25	1.42	0.14	0.81
STAKE 293	2087177.74	749282.13	0.33	1.88	0.23	1.32
STAKE 294	2087191.72	749312.83	0.22	1.27	0.11	0.64
STAKE 295	2087212.11	749286.56	0.29	1.66	0.19	1.08
STAKE 296	2087226.93	749317.71	0.21	1.18	0.09	0.53
STAKE 297	2087246.98	749292.78	0.28	1.60	0.18	1.01
STAKE 298	2087260.25	749323.23	0.25	1.43	0.14	0.82
STAKE 299	2087281.16	749298.05	0.23	1.33	0.12	0.70
STAKE 300	2087292.82	749328.93	0.24	1.36	0.13	0.74
STAKE 301	2087313.94	749301.66	0.27	1.50	0.16	0.90
STAKE 302	2087327.23	749332.53	0.23	1.29	0.12	0.66
STAKE 303	2087349.06	749307.91	0.24	1.33	0.13	0.71
STAKE 304	2087361.60	749336.45	0.19	1.10	0.08	0.44
STAKE 305	2087381.29	749310.79	0.21	1.19	0.10	0.54
STAKE 306	2086871.94	749301.75	0.21	1.22	0.10	0.57
STAKE 307	2086904.82	749304.60	0.24	1.34	0.13	0.72
STAKE 308	2086937.35	749310.77	0.35	1.98	0.25	1.43
STAKE 309	2086967.22	749312.84	0.31	1.76	0.21	1.19
STAKE 310	2087002.35	749320.48	0.35	1.99	0.25	1.44
STAKE 311	2087015.26	749350.62	0.22	1.25	0.11	0.61
STAKE 312	2087036.39	749322.69	0.37	2.07	0.27	1.53

**Appendix E**  
**HPGe Tier I and Tier II RSAL Calculations**

STAKE NUMBER	Easting	Northing	95% UCL Tier I SOR (Fstat)	95% UCL Tier II SOR (Fstat)	Best Fit Tier I SOR	Best Fit Tier II SOR
STAKE 313	2087050.73	749353.61	0.35	2.00	0.26	1.45
STAKE 314	2087070.90	749326.94	0.35	1.99	0.25	1.44
STAKE 315	2087084.44	749359.64	0.35	2.01	0.26	1.46
STAKE 316	2087103.84	749331.47	0.36	2.02	0.26	1.47
STAKE 317	2087119.41	749362.19	0.32	1.83	0.22	1.27
STAKE 318	2087139.28	749336.62	0.31	1.77	0.21	1.20
STAKE 319	2087153.02	749366.27	0.30	1.71	0.20	1.13
STAKE 320	2087174.37	749341.53	0.31	1.77	0.21	1.20
STAKE 321	2087186.85	749369.91	0.29	1.64	0.19	1.06
STAKE 322	2087207.75	749343.63	0.27	1.52	0.16	0.92
STAKE 323	2087222.20	749374.89	0.28	1.61	0.18	1.02
STAKE 324	2087241.84	749348.23	0.25	1.44	0.15	0.83
STAKE 325	2087255.60	749380.57	0.26	1.48	0.15	0.88
STAKE 326	2087276.03	749351.42	0.24	1.34	0.13	0.71
STAKE 327	2087288.33	749384.14	0.26	1.46	0.15	0.85
STAKE 328	2087306.95	749360.37	0.25	1.42	0.14	0.81
STAKE 329	2087322.50	749387.48	0.22	1.27	0.11	0.63
STAKE 330	2087343.36	749364.78	0.23	1.30	0.12	0.67
STAKE 331	2087355.24	749392.28	0.23	1.31	0.12	0.69
STAKE 332	2087375.95	749368.06	0.24	1.38	0.13	0.76
STAKE 333	2087098.21	749391.03	0.26	1.48	0.15	0.87
STAKE 334	2087131.39	749394.00	0.36	2.05	0.27	1.51
STAKE 335	2087146.37	749423.75	0.28	1.61	0.18	1.02
STAKE 336	2087165.63	749396.16	0.41	2.35	0.32	1.82
STAKE 337	2087178.95	749431.41	0.18	1.04	0.07	0.37
STAKE 338	2087200.57	749403.70	0.41	2.32	0.32	1.80
STAKE 339	2087211.98	749434.17	0.29	1.66	0.19	1.08
STAKE 340	2087233.43	749410.44	0.36	2.02	0.26	1.47
STAKE 341	2087245.78	749439.84	0.24	1.36	0.13	0.74
STAKE 342	2087268.09	749414.00	0.29	1.66	0.19	1.07
STAKE 343	2087281.01	749443.36	0.24	1.38	0.13	0.76
STAKE 344	2087303.02	749419.38	0.23	1.31	0.12	0.68
STAKE 345	2087313.98	749449.12	0.24	1.38	0.13	0.76
STAKE 346	2087335.75	749422.10	0.24	1.34	0.13	0.71
STAKE 347	2087225.35	749466.89	0.22	1.22	0.10	0.58
STAKE 348	2087259.13	749473.38	0.24	1.35	0.13	0.73
STAKE 349	2087294.07	749478.27	0.23	1.31	0.12	0.68
STAKE 350	2087303.33	749508.86	0.17	0.94	0.05	0.26
STAKE 351	2087327.79	749483.35	0.25	1.44	0.15	0.83
STAKE 352	2087339.48	749514.49	0.18	1.02	0.06	0.35
STAKE 353	2086620.34	749178.63	0.25	1.40	0.14	0.78
STAKE 354	2086657.99	749183.21	0.31	1.74	0.21	1.17
STAKE 355	2086644.79	749153.59	0.22	1.25	0.11	0.61
STAKE 356	2086678.24	749157.14	0.49	2.77	0.40	2.26
STAKE 357	2086691.89	749188.03	0.16	0.93	0.04	0.24
STAKE 358	2086712.49	749159.10	0.49	2.75	0.40	2.24
STAKE 359	2086725.67	749190.70	0.48	2.74	0.39	2.23

**Appendix E**  
**HPGe Tier I and Tier II RSAL Calculations**

STAKE NUMBER	Easting	Northing	95% UCL Tier I SOR (Fstat)	95% UCL Tier II SOR (Fstat)	Best Fit Tier I SOR	Best Fit Tier II SOR
STAKE 360	2086746.55	749162.69	0.18	0.99	0.05	0.31
STAKE 361	2086759.54	749195.18	0.48	2.72	0.39	2.21
STAKE 362	2086780.07	749167.64	0.70	3.95	0.60	3.41
STAKE 363	2086792.71	749200.16	0.40	2.27	0.31	1.74
STAKE 364	2086816.37	749174.26	0.54	3.05	0.45	2.54
STAKE 365	2086828.92	749207.42	0.36	2.05	0.27	1.50
STAKE 366	2086849.63	749179.53	0.44	2.51	0.35	1.99
STAKE 367	2086862.74	749212.25	0.37	2.12	0.28	1.58
STAKE 368	2086883.87	749184.50	0.35	2.01	0.26	1.46
STAKE 369	2086896.25	749216.55	0.29	1.63	0.19	1.05
STAKE 370	2086916.59	749188.97	0.31	1.77	0.21	1.20
STAKE 371	2086929.36	749221.07	0.27	1.55	0.17	0.96
STAKE 372	2086950.73	749193.71	0.29	1.64	0.19	1.05
STAKE 373	2086963.65	749226.04	0.24	1.36	0.13	0.74
STAKE 374	2086984.28	749198.30	0.32	1.80	0.22	1.23
STAKE 375	2086996.28	749230.50	0.29	1.67	0.19	1.09
STAKE 376	2087017.46	749202.92	0.24	1.34	0.13	0.72
STAKE 377	2087032.08	749233.34	0.28	1.60	0.18	1.01
STAKE 378	2087052.05	749206.28	0.26	1.50	0.16	0.89
STAKE 379	2087065.66	749238.40	0.32	1.83	0.22	1.27
STAKE 380	2087085.80	749210.49	0.28	1.57	0.17	0.97
STAKE 381	2087099.82	749242.51	0.30	1.72	0.20	1.14
STAKE 382	2087119.53	749216.52	0.22	1.24	0.11	0.60
STAKE 383	2087133.04	749248.88	0.25	1.41	0.14	0.80
STAKE 384	2087152.11	749220.83	0.22	1.27	0.11	0.63
STAKE 385	2087166.35	749252.72	0.24	1.36	0.13	0.74
STAKE 386	2087186.71	749225.64	0.25	1.43	0.14	0.82
STAKE 387	2087200.74	749257.70	0.29	1.64	0.19	1.06
STAKE 388	2087220.90	749229.56	0.26	1.47	0.15	0.86
STAKE 389	2087234.84	749261.80	0.21	1.20	0.10	0.56
STAKE 390	2087255.11	749233.63	0.33	1.89	0.23	1.33
STAKE 391	2087268.34	749265.73	0.22	1.25	0.11	0.62
STAKE 392	2087288.32	749237.25	0.33	1.86	0.23	1.30
STAKE 393	2087300.21	749269.81	0.24	1.34	0.13	0.72
STAKE 394	2087321.02	749241.61	0.29	1.62	0.18	1.03
STAKE 395	2087335.44	749272.25	0.19	1.09	0.08	0.43
STAKE 396	2087355.99	749246.16	0.26	1.46	0.15	0.85
STAKE 397	2087368.75	749277.77	0.23	1.29	0.12	0.66
STAKE 398	2087389.74	749250.64	0.31	1.77	0.21	1.20
STAKE 399	2087401.04	749280.60	0.23	1.33	0.12	0.71
STAKE 400	2087422.58	749254.86	0.27	1.50	0.16	0.90
STAKE 401	2087437.14	749285.82	0.18	1.04	0.07	0.37
STAKE 402	2087456.61	749257.30	0.22	1.27	0.11	0.64
STAKE 403	2087470.61	749289.94	0.21	1.19	0.10	0.55
STAKE 404	2087490.86	749261.46	0.25	1.39	0.14	0.78
STAKE 405	2086561.74	749113.51	0.46	2.63	0.37	2.11
STAKE 406	2086548.21	749086.09	0.96	5.46	0.84	4.76

**Appendix E**  
**HPGe Tier I and Tier II RSAL Calculations**

STAKE NUMBER	Easting	Northing	95% UCL Tier I SOR (Fstat)	95% UCL Tier II SOR (Fstat)	Best Fit Tier I SOR	Best Fit Tier II SOR
STAKE 407	2086596.76	749119.98	0.19	1.10	0.08	0.44
STAKE 408	2086580.90	749087.83	0.91	5.13	0.79	4.48
STAKE 409	2086629.92	749120.68	0.58	3.29	0.49	2.78
STAKE 410	2086615.78	749089.37	0.68	3.85	0.59	3.32
STAKE 411	2086664.45	749123.49	0.63	3.59	0.54	3.07
STAKE 412	2086649.33	749095.49	0.67	3.81	0.58	3.28
STAKE 413	2086695.21	749127.25	0.51	2.91	0.42	2.40
STAKE 414	2086683.90	749098.34	0.61	3.44	0.52	2.93
STAKE 415	2086731.42	749133.57	0.44	2.48	0.35	1.96
STAKE 416	2086717.19	749102.08	0.34	1.91	0.24	1.35
STAKE 417	2086766.20	749134.92	0.31	1.77	0.21	1.20
STAKE 418	2086752.50	749103.85	0.27	1.53	0.16	0.93
STAKE 419	2086802.23	749139.66	0.22	1.26	0.11	0.63
STAKE 420	2086790.86	749108.21	0.18	0.99	0.05	0.31
STAKE 421	2086837.67	749145.99	0.23	1.29	0.12	0.66
STAKE 422	2086824.02	749116.62	0.17	0.97	0.05	0.28
STAKE 423	2086871.87	749152.52	0.20	1.13	0.08	0.47
STAKE 424	2086857.56	749122.14	0.17	0.97	0.05	0.28
STAKE 425	2086905.62	749156.77	0.20	1.12	0.08	0.46
STAKE 426	2086893.22	749127.12	0.17	0.97	0.05	0.28
STAKE 427	2086938.27	749161.39	0.17	0.94	0.04	0.24
STAKE 428	2086927.00	749132.33	0.17	0.96	0.05	0.27
STAKE 429	2086973.43	749165.57	0.17	0.94	0.04	0.25
STAKE 430	2086960.45	749137.22	0.23	1.28	0.11	0.64
STAKE 431	2087006.42	749171.20	0.17	0.99	0.05	0.31
STAKE 432	2086993.76	749143.30	0.61	3.47	0.52	2.96
STAKE 433	2087038.27	749179.60	0.22	1.25	0.11	0.62
STAKE 434	2087027.49	749142.33	0.42	2.40	0.33	1.87
STAKE 435	2087074.17	749181.40	0.27	1.52	0.16	0.92
STAKE 436	2087061.22	749149.31	0.41	2.35	0.32	1.82
STAKE 437	2087102.24	749193.92	0.31	1.78	0.21	1.21
STAKE 438	2087090.92	749164.16	0.39	2.21	0.30	1.67
STAKE 439	2087136.49	749190.88	0.27	1.54	0.17	0.94
STAKE 440	2087123.98	749171.55	0.36	2.04	0.26	1.49
STAKE 441	2087170.11	749205.49	0.25	1.39	0.14	0.78
STAKE 442	2087157.33	749176.13	0.39	2.22	0.30	1.69
STAKE 443	2087204.83	749213.60	0.19	1.08	0.07	0.41
STAKE 444	2087192.17	749183.35	0.35	1.96	0.25	1.40
STAKE 445	2087243.12	749200.36	0.17	0.96	0.05	0.27
STAKE 446	2087227.71	749169.87	0.32	1.83	0.22	1.27
STAKE 447	2087277.86	749202.69	0.17	0.96	0.05	0.27
STAKE 448	2087262.48	749169.16	0.29	1.64	0.19	1.05
STAKE 449	2087311.20	749209.34	0.19	1.07	0.07	0.40
STAKE 450	2087296.44	749180.12	0.29	1.63	0.18	1.04
STAKE 451	2087343.92	749212.68	0.25	1.41	0.14	0.79
STAKE 452	2087331.01	749184.32	0.18	1.04	0.06	0.37
STAKE 453	2087378.30	749215.81	0.26	1.49	0.16	0.89

**Appendix E**  
**HPGe Tier I and Tier II RSAL Calculations**

STAKE NUMBER	Easting	Northing	95% UCL Tier I SOR (Fstat)	95% UCL Tier II SOR (Fstat)	Best Fit Tier I SOR	Best Fit Tier II SOR
STAKE 454	2087361.87	749186.54	0.17	0.97	0.05	0.28
STAKE 455	2087408.06	749218.60	0.24	1.38	0.13	0.76
STAKE 456	2087384.85	749189.53	0.17	0.97	0.05	0.28
STAKE 457	2087435.39	749222.88	0.16	0.93	0.04	0.23
STAKE 458	2087420.11	749191.65	0.17	0.99	0.05	0.30
STAKE 459	2086536.75	749055.99	0.84	4.76	0.73	4.15
STAKE 460	2086554.05	749026.53	1.63	9.22	1.36	7.72
STAKE 461	2086562.19	749057.49	1.26	7.16	1.09	6.16
STAKE 462	2086580.08	749028.77	1.52	8.64	1.29	7.29
STAKE 463	2086597.03	749061.14	0.85	4.82	0.74	4.20
STAKE 464	2086615.60	749032.48	1.07	6.04	0.93	5.26
STAKE 465	2086627.58	749061.75	0.29	1.64	0.19	1.05
STAKE 466	2086645.56	749030.78	0.31	1.76	0.21	1.19
STAKE 467	2086671.10	749064.99	0.17	0.97	0.05	0.28
STAKE 468	2086690.82	749039.12	0.50	2.85	0.41	2.34
STAKE 469	2086702.92	749068.15	0.17	0.95	0.05	0.26
STAKE 470	2086723.98	749042.16	0.57	3.23	0.48	2.72
STAKE 471	2086737.79	749071.92	0.17	0.95	0.05	0.26
STAKE 472	2086757.51	749046.85	0.62	3.49	0.52	2.97
STAKE 473	2086770.08	749077.21	0.17	0.94	0.04	0.25
STAKE 474	2086791.88	749049.92	0.52	2.94	0.43	2.43
STAKE 475	2086803.39	749079.50	0.17	0.95	0.05	0.26
STAKE 476	2086823.61	749059.77	0.28	1.59	0.18	0.99
STAKE 477	2086834.88	749081.75	0.17	0.94	0.04	0.25
STAKE 478	2087213.84	749139.42	0.31	1.78	0.21	1.21
STAKE 479	2087347.84	749158.63	0.27	1.53	0.16	0.93
STAKE 480	2087373.10	749135.66	0.26	1.45	0.15	0.85
STAKE 481	2087315.78	749152.09	0.26	1.45	0.15	0.84
STAKE 482	2087330.92	749131.32	0.26	1.48	0.15	0.88
STAKE 483	2087281.90	749148.60	0.28	1.58	0.18	0.99
STAKE 484	2087292.09	749125.88	0.25	1.41	0.14	0.80
STAKE 485	2087249.08	749144.09	0.26	1.45	0.15	0.84
STAKE 486	2087268.30	749118.18	0.28	1.57	0.17	0.98
STAKE 487	2087234.92	749113.25	0.23	1.33	0.12	0.70
STAKE 488	2087183.23	749137.41	0.32	1.83	0.22	1.27
STAKE 489	2087202.34	749109.22	0.29	1.66	0.19	1.08
STAKE 490	2087150.06	749134.59	0.30	1.68	0.19	1.10
STAKE 491	2087170.10	749106.46	0.30	1.69	0.20	1.11
STAKE 492	2087117.40	749128.71	0.39	2.21	0.30	1.67
STAKE 493	2087136.49	749103.82	0.29	1.63	0.18	1.04
STAKE 494	2087086.32	749122.40	0.33	1.88	0.23	1.32
STAKE 495	2087106.16	749102.80	0.34	1.95	0.25	1.39
STAKE 496	2087042.70	749116.51	0.35	2.01	0.26	1.46
STAKE 497	2087063.21	749091.86	0.28	1.59	0.18	1.00
STAKE 498	2087014.17	749118.17	0.30	1.70	0.20	1.12
STAKE 499	2087035.57	749090.76	0.48	2.71	0.39	2.20
STAKE 500	2087571.06	749409.41	0.16	0.92	0.04	0.23

**Appendix E**  
**HPGe Tier I and Tier II RSAL Calculations**

STAKE NUMBER	Easting	Northing	95% UCL Tier I SOR (Fstat)	95% UCL Tier II SOR (Fstat)	Best Fit Tier I SOR	Best Fit Tier II SOR
STAKE 501	2087553.20	749380.89	0.16	0.93	0.04	0.24
STAKE 502	2087525.20	749498.25	0.16	0.93	0.04	0.24
STAKE 503	2087537.17	749468.98	0.17	0.98	0.05	0.29
STAKE 504	2087555.23	749497.93	0.16	0.93	0.04	0.23
STAKE 505	2087573.24	749469.75	0.17	0.95	0.05	0.26
STAKE 506	2087591.09	749500.34	0.23	1.29	0.12	0.66
STAKE 507	2087607.83	749469.11	0.22	1.22	0.10	0.58
STAKE 508	2087624.87	749497.91	0.21	1.18	0.09	0.54
STAKE 509	2087640.16	749469.11	0.20	1.16	0.09	0.50
STAKE 510	2087659.36	749498.39	0.21	1.19	0.10	0.55
STAKE 511	2087674.45	749467.34	0.21	1.18	0.09	0.53
STAKE 512	2087691.86	749495.97	0.21	1.17	0.09	0.52
STAKE 513	2087708.66	749467.61	0.22	1.22	0.10	0.58
STAKE 514	2087725.23	749494.39	0.20	1.14	0.09	0.48
STAKE 515	2087742.45	749467.79	0.20	1.15	0.09	0.49
STAKE 516	2087785.38	749330.54	0.20	1.12	0.08	0.46
STAKE 517	2087606.16	749535.07	0.18	1.05	0.07	0.38
STAKE 518	2087643.87	749529.14	0.21	1.20	0.10	0.55
STAKE 519	2086484.30	748886.63	0.53	3.00	0.44	2.49
STAKE 520	2086491.94	748850.95	0.20	1.13	0.08	0.47
STAKE 521	2086512.51	748881.39	0.51	2.89	0.42	2.39
STAKE 522	2086522.57	748850.67	0.20	1.12	0.08	0.46
STAKE 523	2086545.95	748874.42	0.54	3.06	0.45	2.55
STAKE 524	2086547.67	748846.12	0.23	1.30	0.12	0.67
STAKE 525	2086574.57	748876.25	0.44	2.51	0.35	1.99
STAKE 526	2086581.87	748844.37	0.21	1.17	0.09	0.52
STAKE 527	2086607.62	748872.63	0.45	2.53	0.36	2.01
STAKE 528	2086623.66	748840.23	0.20	1.14	0.08	0.48
STAKE 529	2086637.65	748872.07	0.29	1.63	0.19	1.05
STAKE 530	2086660.29	748840.91	0.21	1.18	0.09	0.53
STAKE 531	2086681.15	748863.58	0.32	1.81	0.22	1.24
STAKE 532	2086694.01	748833.69	0.19	1.09	0.08	0.42
STAKE 533	2086716.35	748861.12	0.34	1.92	0.24	1.37
STAKE 534	2086730.16	748827.73	0.24	1.37	0.13	0.74
STAKE 535	2086749.45	748856.63	0.41	2.33	0.32	1.81
STAKE 536	2086762.10	748824.92	0.26	1.49	0.16	0.88
STAKE 537	2086779.83	748853.83	0.33	1.88	0.23	1.32
STAKE 538	2086793.16	748821.46	0.29	1.62	0.18	1.03
STAKE 539	2086812.79	748849.34	0.24	1.35	0.13	0.72
STAKE 540	2086825.52	748820.94	0.17	0.98	0.05	0.29
STAKE 541	2086845.07	748847.88	0.17	0.98	0.05	0.29
STAKE 542	2086857.50	748815.18	0.20	1.16	0.09	0.50
STAKE 543	2086887.91	748810.85	0.20	1.15	0.09	0.49
STAKE 544	2086870.70	748782.84	0.17	0.94	0.04	0.24
STAKE 545	2086903.96	748781.57	0.24	1.36	0.13	0.74
STAKE 546	2086494.68	748913.13	0.83	4.68	0.72	4.08
STAKE 547	2086530.65	748906.12	0.85	4.79	0.74	4.18

**Appendix E**  
**HPGe Tier I and Tier II RSAL Calculations**

STAKE NUMBER	Easting	Northing	95% UCL Tier I SOR (Fstat)	95% UCL Tier II SOR (Fstat)	Best Fit Tier I SOR	Best Fit Tier II SOR
STAKE 548	2086566.08	748907.05	0.36	2.02	0.26	1.47
STAKE 549	2086599.00	748897.28	0.44	2.52	0.35	2.00
STAKE 550	2086632.94	748903.43	0.42	2.38	0.33	1.85
STAKE 551	2086655.98	748894.29	0.34	1.91	0.24	1.36
STAKE 552	2086696.86	748886.37	0.35	1.96	0.25	1.41
STAKE 553	2086731.12	748883.14	0.37	2.07	0.27	1.53
STAKE 554	2086766.03	748879.40	0.35	1.97	0.25	1.41
STAKE 555	2086799.13	748875.56	0.36	2.02	0.26	1.47
STAKE 556	2086831.90	748875.36	0.32	1.82	0.22	1.26
STAKE 557	2086849.54	748903.14	0.31	1.74	0.21	1.17
STAKE 558	2086880.69	748902.99	0.28	1.56	0.17	0.96
STAKE 559	2086903.73	748926.72	0.37	2.10	0.27	1.56
STAKE 560	2086869.98	748933.45	0.32	1.83	0.22	1.27
STAKE 561	2086835.46	748934.55	0.33	1.89	0.23	1.33
STAKE 562	2086803.60	748943.34	0.30	1.71	0.20	1.13
STAKE 563	2086813.19	748908.14	0.35	1.98	0.25	1.43
STAKE 564	2086767.88	748939.43	0.37	2.12	0.28	1.58
STAKE 565	2086781.53	748911.68	0.40	2.25	0.30	1.72
STAKE 566	2086737.13	748938.51	0.40	2.29	0.31	1.76
STAKE 567	2086749.52	748911.98	0.40	2.26	0.30	1.72
STAKE 568	2086704.79	748938.07	0.40	2.25	0.30	1.71
STAKE 569	2086716.40	748910.57	0.45	2.57	0.36	2.05
STAKE 570	2086672.63	748949.47	0.42	2.40	0.33	1.88
STAKE 571	2086681.12	748918.65	0.40	2.29	0.31	1.76
STAKE 572	2086646.07	748953.23	0.46	2.59	0.37	2.07
STAKE 573	2086661.66	748926.46	0.47	2.68	0.38	2.17
STAKE 574	2086621.24	748938.85	0.56	3.14	0.47	2.64
STAKE 575	2086595.46	748927.78	0.54	3.08	0.45	2.57
STAKE 576	2086568.73	748943.90	0.39	2.24	0.30	1.70
STAKE 577	2086539.86	748927.10	0.58	3.29	0.49	2.77
STAKE 578	2086522.01	748932.11	0.49	2.76	0.40	2.25
STAKE 579	2086486.25	748943.04	0.20	1.12	0.08	0.46
STAKE 580	2086512.06	748967.76	0.62	3.49	0.53	2.98
STAKE 581	2086542.06	748960.04	0.38	2.16	0.29	1.62
STAKE 582	2086533.86	748992.58	1.06	5.99	0.92	5.21
STAKE 583	2086567.53	748981.36	0.52	2.92	0.43	2.41
STAKE 584	2086601.86	748986.36	0.59	3.37	0.50	2.85
STAKE 585	2086591.86	748960.67	0.45	2.54	0.36	2.02
STAKE 586	2086623.59	748960.18	0.36	2.02	0.26	1.47
STAKE 587	2086641.51	749006.22	0.51	2.91	0.42	2.40
STAKE 588	2086660.28	748983.74	0.35	2.00	0.26	1.45
STAKE 589	2086678.38	749008.83	0.28	1.59	0.18	1.00
STAKE 590	2086711.53	749014.95	0.32	1.82	0.22	1.25
STAKE 591	2086743.97	749017.04	0.34	1.91	0.24	1.35
STAKE 592	2086775.42	749021.57	0.37	2.10	0.27	1.56
STAKE 593	2086806.37	749023.88	0.30	1.70	0.20	1.12
STAKE 594	2086934.51	749073.88	0.26	1.47	0.15	0.87

301

**Appendix E**  
**HPGe Tier I and Tier II RSAL Calculations**

STAKE NUMBER	Easting	Northing	95% UCL Tier I SOR (Fstat)	95% UCL Tier II SOR (Fstat)	Best Fit Tier I SOR	Best Fit Tier II SOR
STAKE 595	2086950.10	749104.95	0.53	3.01	0.44	2.50
STAKE 596	2086968.72	749079.82	0.48	2.74	0.39	2.23
STAKE 597	2086956.93	749050.81	0.41	2.33	0.32	1.80
STAKE 598	2086992.66	749057.56	0.36	2.06	0.27	1.51
STAKE 599	2087024.57	749060.44	0.45	2.55	0.36	2.03
STAKE 600	2087057.56	749064.76	0.37	2.08	0.27	1.53
STAKE 601	2087092.94	749067.13	0.35	2.00	0.26	1.46
STAKE 602	2087121.18	749069.56	0.34	1.94	0.24	1.38
STAKE 603	2087156.64	749072.42	0.31	1.76	0.21	1.18
STAKE 604	2087141.17	749046.03	0.39	2.21	0.30	1.68
STAKE 605	2087079.88	749040.80	0.41	2.30	0.31	1.77
STAKE 606	2087118.78	749044.44	0.44	2.49	0.35	1.97
STAKE 607	2087045.61	749035.92	0.47	2.64	0.38	2.12
STAKE 608	2087014.69	749031.63	0.37	2.10	0.28	1.56
STAKE 609	2086978.38	749028.21	0.39	2.21	0.30	1.67
STAKE 610	2086945.92	749026.04	0.50	2.84	0.41	2.33
STAKE 611	2086967.39	748998.34	0.33	1.86	0.23	1.30
STAKE 612	2087002.99	749001.83	0.54	3.05	0.45	2.54
STAKE 613	2087035.03	749005.28	0.38	2.15	0.28	1.61
STAKE 614	2087057.46	749008.54	0.42	2.39	0.33	1.87
STAKE 615	2087058.28	749007.25	0.36	2.03	0.26	1.48
STAKE 616	2087019.02	748975.71	0.32	1.80	0.22	1.23
STAKE 617	2086920.60	748956.77	0.46	2.63	0.37	2.12
STAKE 618	2086956.09	748962.65	0.38	2.15	0.28	1.61
STAKE 619	2087095.06	749014.84	0.38	2.13	0.28	1.59
STAKE 620	2086707.77	748990.80	0.34	1.92	0.24	1.37
STAKE 621	2086734.85	748991.83	0.31	1.74	0.21	1.16
STAKE 622	2086763.17	748992.09	0.34	1.92	0.24	1.36
STAKE 623	2086800.69	748993.79	0.33	1.85	0.23	1.29
STAKE 624	2086833.86	748997.50	0.37	2.12	0.28	1.58
STAKE 625	2086979.56	749107.28	0.35	1.99	0.25	1.44
STAKE 626	2087001.32	749084.91	0.34	1.94	0.24	1.38
STAKE 627	2086011.99	748785.58	0.23	1.29	0.12	0.66
STAKE 628	2085995.86	748755.74	0.22	1.22	0.10	0.57
STAKE 629	2085979.91	748784.89	0.25	1.42	0.14	0.81
STAKE 630	2085962.06	748757.35	0.27	1.55	0.17	0.95
STAKE 631	2085949.01	748778.05	0.38	2.15	0.28	1.61
STAKE 632	2085932.47	748755.67	0.21	1.18	0.09	0.53
STAKE 633	2085898.79	748693.84	0.24	1.35	0.13	0.72
STAKE 634	2085913.92	748722.00	0.18	1.05	0.07	0.37
STAKE 635	2085927.94	748692.39	0.52	2.93	0.43	2.42
STAKE 636	2085944.79	748721.55	0.20	1.13	0.08	0.48
STAKE 637	2085961.68	748698.52	0.19	1.09	0.07	0.42
STAKE 638	2085974.40	748723.24	0.18	1.05	0.07	0.38
STAKE 639	2085994.53	748691.50	0.18	1.02	0.06	0.34
STAKE 640	2086014.75	748722.04	0.33	1.85	0.23	1.28
STAKE 641	2086028.44	748693.18	0.62	3.51	0.53	2.99

302



**Appendix E**  
**HPGe Tier I and Tier II RSAL Calculations**

STAKE NUMBER	Easting	Northing	95% UCL Tier I SOR (Fstat)	95% UCL Tier II SOR (Fstat)	Best Fit Tier I SOR	Best Fit Tier II SOR
STAKE 642	2086044.66	748720.19	0.89	5.04	0.78	4.40
STAKE 643	2086062.46	748694.69	1.33	7.53	1.14	6.45
STAKE 644	2086079.03	748721.39	1.03	5.85	0.90	5.09
STAKE 645	2086094.58	748690.61	0.24	1.36	0.13	0.73
STAKE 646	2086112.18	748717.96	0.20	1.14	0.08	0.48
STAKE 647	2086129.58	748692.13	0.48	2.70	0.39	2.19
STAKE 648	2086144.72	748719.56	0.17	0.97	0.05	0.28
STAKE 649	2086157.19	748694.48	0.35	1.96	0.25	1.40
STAKE 650	2086171.71	748723.25	0.17	0.95	0.04	0.25
STAKE 651	2086189.44	748693.32	0.65	3.67	0.56	3.15
STAKE 652	2086205.15	748719.58	0.82	4.62	0.71	4.02
STAKE 653	2086228.59	748690.85	0.51	2.87	0.42	2.36
STAKE 654	2086245.35	748718.73	0.69	3.90	0.59	3.36
STAKE 655	2086212.71	748661.41	0.44	2.50	0.35	1.98
STAKE 656	2086179.36	748662.26	0.45	2.53	0.36	2.02
STAKE 657	2086148.29	748663.53	0.65	3.70	0.56	3.17
STAKE 658	2086132.71	748634.60	0.39	2.22	0.30	1.69
STAKE 659	2086120.16	748663.25	0.69	3.89	0.59	3.35
STAKE 660	2086102.76	748634.87	0.37	2.07	0.27	1.53
STAKE 661	2086083.14	748663.60	0.58	3.30	0.49	2.79
STAKE 662	2086059.76	748634.20	0.68	3.84	0.58	3.31
STAKE 663	2086043.93	748662.55	0.36	2.01	0.26	1.46
STAKE 664	2086028.25	748635.37	0.20	1.12	0.08	0.46
STAKE 665	2086013.85	748662.60	0.20	1.14	0.09	0.49
STAKE 666	2085991.96	748633.56	0.18	1.03	0.06	0.35
STAKE 667	2085977.51	748666.57	0.18	1.02	0.06	0.34
STAKE 668	2085961.03	748634.76	0.35	1.97	0.25	1.42
STAKE 669	2085947.08	748667.47	0.53	3.00	0.44	2.49
STAKE 670	2085932.35	748639.73	0.30	1.70	0.20	1.12
STAKE 671	2085917.40	748667.30	0.33	1.90	0.24	1.34
STAKE 672	2085893.31	748639.67	0.16	0.92	0.04	0.23
STAKE 673	2085883.50	748672.23	0.18	1.01	0.06	0.34
STAKE 674	2085866.02	748643.46	0.18	1.00	0.06	0.32
STAKE 675	2085848.43	748670.27	0.17	0.98	0.05	0.29
STAKE 676	2085828.19	748649.88	0.18	1.02	0.06	0.35
STAKE 677	2085846.28	748620.32	0.17	0.96	0.05	0.27
STAKE 678	2085831.10	748589.20	0.17	0.97	0.05	0.28
STAKE 679	2085876.43	748610.24	0.17	0.94	0.04	0.25
STAKE 680	2085863.30	748583.01	0.18	1.00	0.06	0.32
STAKE 681	2085912.89	748612.55	0.23	1.32	0.12	0.70
STAKE 682	2085893.01	748583.89	0.21	1.20	0.10	0.55
STAKE 683	2085941.98	748608.45	0.32	1.82	0.22	1.25
STAKE 684	2085925.42	748579.35	0.28	1.57	0.17	0.98
STAKE 685	2085975.03	748605.56	0.25	1.43	0.14	0.82
STAKE 686	2085957.79	748576.60	0.23	1.29	0.12	0.66
STAKE 687	2086008.41	748604.67	0.18	1.02	0.06	0.34
STAKE 688	2085994.62	748575.42	0.23	1.30	0.12	0.67

**Appendix E**  
**HPGe Tier I and Tier II RSAL Calculations**

STAKE NUMBER	Easting	Northing	95% UCL Tier I SOR (Fstat)	95% UCL Tier II SOR (Fstat)	Best Fit Tier I SOR	Best Fit Tier II SOR
STAKE 689	2086041.99	748602.80	0.33	1.89	0.24	1.33
STAKE 690	2086023.10	748571.51	0.25	1.43	0.14	0.82
STAKE 691	2086080.34	748603.23	0.32	1.82	0.22	1.25
STAKE 692	2086061.84	748573.27	0.64	3.60	0.54	3.08
STAKE 693	2086105.02	748601.89	0.37	2.11	0.28	1.57
STAKE 694	2086087.02	748575.16	0.29	1.63	0.18	1.04
STAKE 695	2086009.74	748542.43	0.26	1.48	0.15	0.88
STAKE 696	2086044.92	748546.98	0.32	1.83	0.22	1.26
STAKE 697	2085977.40	748547.86	0.24	1.38	0.13	0.76
STAKE 698	2085956.35	748516.63	0.23	1.32	0.12	0.70
STAKE 699	2085943.40	748546.30	0.23	1.32	0.12	0.69
STAKE 700	2085924.09	748520.71	0.23	1.30	0.12	0.67
STAKE 701	2085914.95	748549.29	0.21	1.21	0.10	0.56
STAKE 702	2085894.42	748525.27	0.25	1.39	0.14	0.77
STAKE 703	2085883.17	748551.38	0.24	1.36	0.13	0.74
STAKE 704	2085862.87	748523.97	0.24	1.36	0.13	0.74
STAKE 705	2085849.54	748554.39	0.23	1.33	0.12	0.71
STAKE 706	2085827.99	748528.91	0.23	1.30	0.12	0.66
STAKE 707	2085817.34	748560.04	0.17	0.95	0.05	0.26
STAKE 708	2085793.39	748532.06	0.22	1.23	0.10	0.58
STAKE 709	2085782.28	748563.58	0.18	1.04	0.07	0.37
STAKE 710	2085762.97	748534.89	0.19	1.09	0.08	0.43
STAKE 711	2085776.37	748505.71	0.18	1.05	0.07	0.38
STAKE 712	2085756.39	748478.21	0.18	1.02	0.06	0.34
STAKE 713	2085808.65	748500.60	0.19	1.09	0.08	0.43
STAKE 714	2085792.16	748472.77	0.19	1.08	0.07	0.41
STAKE 715	2085843.90	748500.45	0.21	1.19	0.10	0.55
STAKE 716	2085823.40	748469.70	0.19	1.09	0.08	0.43
STAKE 717	2085875.75	748493.34	0.22	1.22	0.10	0.58
STAKE 718	2085854.49	748466.61	0.20	1.15	0.09	0.49
STAKE 719	2085803.34	748446.64	0.18	1.03	0.06	0.35
STAKE 720	2085767.26	748447.73	0.17	0.95	0.05	0.26
STAKE 721	2085740.42	748447.43	0.18	1.00	0.06	0.32
STAKE 722	2085751.82	748421.89	0.17	0.97	0.05	0.29
STAKE 723	2085706.53	748453.24	0.17	0.97	0.05	0.29
STAKE 724	2085717.51	748426.02	0.17	0.98	0.05	0.30
STAKE 725	2086043.15	748778.43	0.25	1.43	0.15	0.83
STAKE 726	2086026.41	748753.49	0.27	1.53	0.17	0.94
STAKE 727	2086075.86	748777.22	0.31	1.76	0.21	1.19
STAKE 728	2086058.57	748750.69	0.33	1.88	0.23	1.32
STAKE 729	2086110.88	748777.78	0.58	3.27	0.49	2.76
STAKE 730	2086093.33	748749.38	0.42	2.39	0.33	1.86
STAKE 731	2086135.06	748779.41	0.37	2.11	0.28	1.57
STAKE 732	2086125.78	748766.95	0.21	1.20	0.10	0.54
STAKE 733	2086178.62	748774.94	0.29	1.66	0.19	1.08
STAKE 734	2086159.48	748749.21	0.27	1.50	0.16	0.90
STAKE 735	2086215.26	748770.30	0.90	5.08	0.78	4.44

**Appendix E**  
**HPGe Tier I and Tier II RSAL Calculations**

STAKE NUMBER	Easting	Northing	95% UCL Tier I SOR (Fstat)	95% UCL Tier II SOR (Fstat)	Best Fit Tier I SOR	Best Fit Tier II SOR
STAKE 736	2086197.34	748746.40	0.21	1.20	0.10	0.54
STAKE 737	2086245.82	748776.02	0.34	1.90	0.24	1.34
STAKE 738	2086227.65	748742.45	0.68	3.86	0.59	3.33
STAKE 739	2086279.41	748770.91	0.37	2.10	0.27	1.56
STAKE 740	2086263.68	748747.26	0.85	4.82	0.74	4.21
STAKE 741	2086315.84	748776.44	0.32	1.79	0.21	1.22
STAKE 742	2086295.69	748748.22	0.40	2.29	0.31	1.76
STAKE 743	2086329.29	748801.59	0.44	2.48	0.35	1.96
STAKE 744	2086344.24	748826.77	0.65	3.71	0.56	3.18
STAKE 745	2086298.38	748803.04	0.61	3.43	0.52	2.92
STAKE 746	2086317.38	748831.63	0.65	3.66	0.55	3.13
STAKE 747	2086264.28	748802.55	0.50	2.84	0.41	2.33
STAKE 748	2086286.36	748835.29	0.90	5.11	0.79	4.46
STAKE 749	2086829.73	748714.60	0.25	1.44	0.15	0.83
STAKE 750	2086846.94	748687.20	0.31	1.77	0.21	1.20
STAKE 751	2086872.12	748715.85	0.22	1.27	0.11	0.63
STAKE 752	2086880.98	748680.06	0.30	1.72	0.20	1.15
STAKE 753	2086912.17	748674.81	0.29	1.63	0.18	1.05
STAKE 754	2086947.93	748667.24	0.20	1.16	0.09	0.51
STAKE 755	2086892.78	748652.47	0.27	1.52	0.16	0.92
STAKE 756	2086928.32	748645.46	0.21	1.21	0.10	0.57
STAKE 757	2086980.50	748664.24	0.17	0.95	0.05	0.26
STAKE 758	2086960.81	748641.32	0.22	1.27	0.11	0.64
STAKE 759	2086906.52	748618.83	0.23	1.31	0.12	0.69
STAKE 760	2086870.77	748622.77	0.25	1.39	0.14	0.78
STAKE 761	2086780.10	748609.29	0.29	1.63	0.18	1.05
STAKE 762	2086818.54	748602.94	0.27	1.51	0.16	0.91
STAKE 763	2086850.71	748597.39	0.24	1.39	0.14	0.77
STAKE 764	2086882.07	748593.49	0.25	1.40	0.14	0.79
STAKE 765	2086759.73	748581.78	0.27	1.51	0.16	0.91
STAKE 766	2086793.64	748576.07	0.28	1.60	0.18	1.01
STAKE 767	2086826.98	748569.40	0.27	1.53	0.16	0.93
STAKE 768	2086862.16	748563.17	0.21	1.19	0.10	0.54
STAKE 769	2086894.85	748558.50	0.24	1.35	0.13	0.73
STAKE 770	2086926.89	748550.63	0.21	1.18	0.09	0.54
STAKE 771	2087045.32	748892.69	0.23	1.31	0.12	0.68
STAKE 772	2087049.01	748928.02	0.19	1.08	0.07	0.41
STAKE 773	2087079.96	748904.40	0.21	1.19	0.09	0.54
STAKE 774	2087092.15	748926.91	0.25	1.41	0.14	0.80
STAKE 775	2087066.43	748956.67	0.25	1.41	0.14	0.80
STAKE 776	2087098.70	748961.10	0.15	0.87	0.03	0.17
STAKE 777	2087075.88	748988.34	0.26	1.49	0.16	0.89
STAKE 778	2087108.21	748992.87	0.33	1.87	0.23	1.31
STAKE 779	2087144.13	748996.94	0.20	1.11	0.08	0.45
STAKE 780	2087177.75	749001.43	0.19	1.08	0.07	0.42
STAKE 781	2087131.60	749022.49	0.35	1.99	0.25	1.44
STAKE 782	2087165.49	749025.96	0.17	0.97	0.05	0.28

**Appendix E**  
**HPGe Tier I and Tier II RSAL Calculations**

STAKE NUMBER	Easting	Northing	95% UCL Tier I SOR (Fstat)	95% UCL Tier II SOR (Fstat)	Best Fit Tier I SOR	Best Fit Tier II SOR
STAKE 783	2087197.83	749028.96	0.20	1.14	0.08	0.48
STAKE 784	2087176.15	749054.96	0.20	1.16	0.09	0.50
STAKE 785	2087188.64	749066.90	0.24	1.36	0.13	0.74
STAKE 786	2087208.33	749053.01	0.39	2.23	0.30	1.70
STAKE 787	2087217.83	749070.57	0.27	1.55	0.17	0.95
STAKE 788	2087240.70	749055.03	0.26	1.47	0.15	0.86
STAKE 789	2087254.79	749080.19	0.30	1.68	0.19	1.10
STAKE 790	2087279.28	749055.43	0.25	1.42	0.14	0.81
STAKE 791	2087288.41	749085.84	0.27	1.52	0.16	0.92
STAKE 792	2087310.76	749059.03	0.38	2.18	0.29	1.64
STAKE 793	2087321.04	749094.83	0.28	1.57	0.17	0.98
STAKE 794	2087346.04	749059.57	0.27	1.52	0.16	0.92
STAKE 795	2087356.00	749102.24	0.27	1.53	0.16	0.93
STAKE 796	2087374.81	749063.66	0.25	1.41	0.14	0.80
STAKE 797	2087390.24	749106.45	0.26	1.49	0.16	0.89
STAKE 798	2087415.33	749081.70	0.25	1.44	0.15	0.83
STAKE 799	2087423.31	749113.15	0.26	1.50	0.16	0.90
STAKE 800	2087452.90	749120.86	0.27	1.53	0.17	0.94
STAKE 801	2087488.34	749126.46	0.21	1.17	0.09	0.52
STAKE 802	2087526.79	749127.59	0.17	0.95	0.05	0.26
STAKE 803	2087512.39	749099.67	0.18	1.00	0.06	0.32
STAKE 804	2087480.31	749094.33	0.23	1.31	0.12	0.69
STAKE 805	2087444.67	749085.54	0.26	1.46	0.15	0.86
STAKE 806	2087469.09	749061.59	0.27	1.54	0.17	0.94
STAKE 807	2087433.13	749055.65	0.27	1.55	0.17	0.95
STAKE 808	2087398.61	749055.44	0.28	1.58	0.18	0.99
STAKE 809	2087502.61	749069.98	0.22	1.27	0.11	0.64
STAKE 810	2087494.31	749036.09	0.27	1.54	0.17	0.94
STAKE 811	2087475.04	749007.86	0.28	1.59	0.18	1.00
STAKE 812	2087455.58	749029.38	0.30	1.68	0.20	1.11
STAKE 813	2086428.55	748423.71	0.22	1.23	0.10	0.59
STAKE 814	2086408.52	748400.77	0.23	1.31	0.12	0.68
STAKE 815	2086463.90	748412.95	0.22	1.23	0.10	0.59
STAKE 816	2086437.59	748390.24	0.22	1.27	0.11	0.63
STAKE 817	2086494.02	748410.27	0.20	1.13	0.08	0.47
STAKE 818	2086475.34	748386.10	0.23	1.28	0.11	0.64
STAKE 819	2086623.56	748451.77	0.22	1.24	0.11	0.60
STAKE 820	2086657.69	748448.23	0.24	1.36	0.13	0.73
STAKE 821	2086233.33	748516.26	0.26	1.50	0.16	0.90
STAKE 822	2086222.98	748550.19	0.29	1.65	0.19	1.07
STAKE 823	2086210.21	748491.63	0.24	1.36	0.13	0.74
STAKE 824	2086200.39	748525.64	0.28	1.60	0.18	1.01
STAKE 825	2086187.64	748468.52	0.21	1.17	0.09	0.52
STAKE 826	2086178.19	748499.40	0.24	1.38	0.13	0.76
STAKE 827	2086162.91	748442.01	0.20	1.14	0.09	0.48
STAKE 828	2086153.45	748473.75	0.22	1.25	0.11	0.61
STAKE 829	2086142.55	748419.78	0.20	1.14	0.09	0.48

306

**Appendix E**  
**HPGe Tier I and Tier II RSAL Calculations**

STAKE NUMBER	Easting	Northing	95% UCL Tier I SOR (Fstat)	95% UCL Tier II SOR (Fstat)	Best Fit Tier I SOR	Best Fit Tier II SOR
STAKE 830	2086130.91	748448.19	0.21	1.21	0.10	0.57
STAKE 831	2086108.08	748422.01	0.21	1.21	0.10	0.56
STAKE 832	2086167.27	748530.05	0.26	1.46	0.15	0.86
STAKE 833	2086145.29	748499.13	0.24	1.34	0.13	0.71
STAKE 834	2086123.51	748480.84	0.23	1.30	0.12	0.66
STAKE 835	2086092.14	748491.43	0.23	1.30	0.12	0.67
STAKE 836	2086097.67	748458.18	0.21	1.19	0.10	0.55
STAKE 837	2086066.37	748467.49	0.22	1.22	0.10	0.58
STAKE 838	2086216.92	748458.65	0.22	1.25	0.11	0.61
STAKE 839	2086226.87	748425.94	0.21	1.19	0.10	0.54
STAKE 840	2086241.07	748481.07	0.28	1.57	0.17	0.98
STAKE 841	2086252.04	748450.08	0.17	0.98	0.05	0.29
STAKE 842	2086271.80	748470.16	0.17	0.97	0.05	0.28
STAKE 843	2086264.39	748419.04	0.17	0.98	0.05	0.30
STAKE 844	2086267.80	748507.44	0.20	1.11	0.08	0.45
STAKE 845	2086297.41	748499.72	0.26	1.48	0.15	0.88
STAKE 846	2087229.89	749027.16	0.31	1.75	0.21	1.18
STAKE 847	2087252.05	749001.05	0.27	1.54	0.17	0.94
STAKE 848	2087263.38	749032.05	0.29	1.63	0.18	1.04
STAKE 849	2087286.58	749005.57	0.31	1.75	0.21	1.18
STAKE 850	2087271.88	748975.19	0.30	1.69	0.20	1.11
STAKE 851	2087289.27	748944.12	0.18	1.00	0.06	0.32
STAKE 852	2087305.13	748974.31	0.31	1.73	0.20	1.16
STAKE 853	2087326.47	748946.99	0.29	1.67	0.19	1.09
STAKE 854	2087316.06	748914.81	0.26	1.46	0.15	0.86
STAKE 855	2087342.67	748920.75	0.28	1.60	0.18	1.01
STAKE 856	2087331.44	748888.55	0.24	1.34	0.13	0.72
STAKE 857	2087365.81	748894.61	0.25	1.44	0.15	0.83
STAKE 858	2087351.58	748862.02	0.22	1.23	0.10	0.59
STAKE 859	2087385.54	748864.26	0.23	1.33	0.12	0.70
STAKE 860	2087301.62	749039.44	0.31	1.75	0.21	1.18
STAKE 861	2087333.58	749026.84	0.25	1.43	0.15	0.82
STAKE 862	2087307.04	749005.32	0.28	1.60	0.18	1.01
STAKE 863	2087349.08	748994.16	0.28	1.60	0.18	1.01
STAKE 864	2087338.44	748974.50	0.31	1.76	0.21	1.19
STAKE 865	2087372.70	748972.32	0.27	1.50	0.16	0.90
STAKE 866	2087357.50	748952.82	0.29	1.62	0.18	1.04
STAKE 867	2087389.91	748943.91	0.26	1.49	0.16	0.89
STAKE 868	2087373.33	748917.13	0.29	1.65	0.19	1.07
STAKE 869	2087405.28	748916.17	0.25	1.42	0.14	0.81
STAKE 870	2087389.98	748887.75	0.28	1.59	0.18	1.00
STAKE 871	2087425.04	748885.84	0.25	1.42	0.14	0.81
STAKE 872	2087406.36	748856.91	0.28	1.56	0.17	0.97
STAKE 873	2087445.17	748800.47	0.22	1.25	0.11	0.61
STAKE 874	2087427.73	748829.30	0.25	1.41	0.14	0.79
STAKE 875	2087403.22	749028.46	0.29	1.62	0.18	1.04
STAKE 876	2087368.01	749028.85	0.34	1.93	0.24	1.37

307

**Appendix E**  
**HPGe Tier I and Tier II RSAL Calculations**

STAKE NUMBER	Easting	Northing	95% UCL Tier I SOR (Fstat)	95% UCL Tier II SOR (Fstat)	Best Fit Tier I SOR	Best Fit Tier II SOR
STAKE 877	2087417.28	748995.66	0.29	1.63	0.18	1.04
STAKE 878	2087386.65	748996.57	0.29	1.62	0.18	1.04
STAKE 879	2087437.93	748967.93	0.29	1.63	0.18	1.04
STAKE 880	2087406.08	748971.23	0.24	1.37	0.13	0.75
STAKE 881	2087456.10	748942.72	0.22	1.25	0.11	0.61
STAKE 882	2087418.62	748940.58	0.26	1.49	0.16	0.89
STAKE 883	2087440.46	748909.17	0.24	1.33	0.13	0.71
STAKE 884	2087473.65	748910.63	0.27	1.53	0.16	0.93
STAKE 885	2087455.07	748878.02	0.23	1.29	0.12	0.66
STAKE 886	2087475.83	748845.44	0.24	1.38	0.13	0.76
STAKE 887	2087446.50	749005.80	0.29	1.66	0.19	1.08
STAKE 888	2087460.75	748974.60	0.30	1.67	0.19	1.09
STAKE 889	2087484.59	748948.16	0.25	1.39	0.14	0.78
STAKE 890	2087498.45	748976.75	0.32	1.80	0.22	1.23
STAKE 891	2087506.99	748919.86	0.24	1.36	0.13	0.74
STAKE 892	2087517.86	748952.06	0.27	1.51	0.16	0.91
STAKE 893	2087560.06	748899.14	0.21	1.17	0.09	0.52
STAKE 894	2087540.07	748925.46	0.27	1.50	0.16	0.90
STAKE 895	2087530.40	748984.53	0.25	1.44	0.15	0.83
STAKE 896	2087510.80	749008.43	0.32	1.79	0.22	1.22
STAKE 897	2087383.28	749160.83	0.26	1.48	0.15	0.87
STAKE 898	2087402.38	749129.33	0.27	1.51	0.16	0.91
STAKE 899	2087416.79	749167.46	0.17	0.94	0.04	0.25
STAKE 900	2087436.97	749144.05	0.26	1.45	0.15	0.84
STAKE 901	2087443.92	749172.92	0.17	0.94	0.04	0.25
STAKE 902	2087462.75	749150.11	0.17	0.97	0.05	0.29
STAKE 903	2087493.41	749159.13	0.16	0.91	0.04	0.21
STAKE 904	2086777.32	748558.15	0.23	1.31	0.12	0.68
STAKE 905	2086808.19	748548.96	0.26	1.49	0.16	0.89
STAKE 906	2086842.92	748540.42	0.26	1.50	0.16	0.89
STAKE 907	2086881.06	748537.22	0.21	1.17	0.09	0.52
STAKE 908	2086887.73	748504.34	0.21	1.21	0.10	0.57
STAKE 909	2086905.52	748526.95	0.21	1.19	0.10	0.55
STAKE 910	2086862.97	748480.95	0.24	1.34	0.13	0.71
STAKE 911	2086850.42	748511.08	0.23	1.32	0.12	0.69
STAKE 912	2086831.65	748485.08	0.25	1.44	0.15	0.83
STAKE 913	2086818.67	748518.23	0.26	1.49	0.16	0.89
STAKE 914	2086848.01	748456.12	0.23	1.33	0.12	0.70
STAKE 915	2086814.44	748457.22	0.23	1.32	0.12	0.69
STAKE 916	2086930.83	748613.85	0.24	1.35	0.13	0.72
STAKE 917	2086535.55	748395.54	0.21	1.19	0.10	0.55
STAKE 918	2086940.94	748701.01	0.25	1.43	0.14	0.81
STAKE 919	2086927.62	748733.16	0.20	1.11	0.08	0.45
STAKE 920	2086972.19	748698.79	0.17	0.98	0.05	0.29
STAKE 921	2086961.39	748730.52	0.17	0.96	0.05	0.27
STAKE 922	2086901.45	748706.98	0.26	1.45	0.15	0.84
STAKE 923	2087197.25	748973.95	0.17	0.96	0.05	0.27

**Appendix E**  
**HPGe Tier I and Tier II RSAL Calculations**

STAKE NUMBER	Easting	Northing	95% UCL Tier I SOR (Fstat)	95% UCL Tier II SOR (Fstat)	Best Fit Tier I SOR	Best Fit Tier II SOR
STAKE 924	2087161.31	748981.69	0.19	1.08	0.07	0.41
STAKE 925	2087203.08	748943.92	0.17	0.96	0.05	0.27
STAKE 926	2087180.11	748943.04	0.20	1.11	0.08	0.45
STAKE 927	2087181.59	748912.89	0.18	1.02	0.06	0.34
STAKE 928	2087209.96	748906.00	0.22	1.26	0.11	0.63
STAKE 929	2087194.59	748880.81	0.17	0.97	0.05	0.28
STAKE 930	2087227.36	748876.95	0.16	0.92	0.04	0.22
STAKE 931	2087208.74	748847.91	0.18	1.00	0.06	0.31
STAKE 932	2087238.68	748843.71	0.20	1.11	0.08	0.44
STAKE 933	2087222.92	748808.93	0.17	0.95	0.05	0.27
STAKE 934	2087248.82	748809.78	0.19	1.08	0.07	0.41
STAKE 935	2087269.97	748785.62	0.18	1.00	0.06	0.32
STAKE 936	2087235.70	748778.71	0.17	0.98	0.05	0.29
STAKE 937	2087307.99	748790.24	0.17	0.94	0.04	0.25
STAKE 938	2087300.55	748764.30	0.21	1.20	0.10	0.56
STAKE 939	2087334.92	748804.82	0.17	0.94	0.04	0.24
STAKE 940	2087332.18	748771.91	0.20	1.15	0.09	0.49
STAKE 941	2087312.61	748827.63	0.18	1.00	0.06	0.32
STAKE 942	2087341.68	748837.63	0.19	1.08	0.07	0.41
STAKE 943	2087313.90	748858.24	0.21	1.21	0.10	0.57
STAKE 944	2087295.72	748887.95	0.23	1.29	0.12	0.66
STAKE 945	2087287.17	748919.74	0.22	1.25	0.11	0.62
STAKE 946	2087258.35	748935.56	0.20	1.15	0.09	0.49
STAKE 947	2087247.70	748968.41	0.21	1.18	0.09	0.54
STAKE 948	2087224.31	748994.25	0.27	1.53	0.16	0.93
STAKE 949	2087034.40	748860.39	0.17	0.95	0.05	0.26
STAKE 950	2087071.95	748871.89	0.19	1.06	0.07	0.38
STAKE 951	2087061.23	748842.07	0.18	1.00	0.06	0.32
STAKE 952	2087036.65	748824.33	0.18	1.01	0.06	0.33
STAKE 953	2087525.75	749038.44	0.19	1.10	0.08	0.44
STAKE 954	2087533.72	749073.36	0.17	0.95	0.05	0.26
STAKE 955	2087537.36	749011.50	0.20	1.15	0.09	0.50
STAKE 956	2087555.10	749040.89	0.17	0.96	0.05	0.27
STAKE 957	2087575.95	749012.07	0.16	0.93	0.04	0.24
STAKE 958	2087586.41	749039.57	0.17	0.96	0.05	0.27
STAKE 959	2087610.07	749013.87	0.16	0.93	0.04	0.24
STAKE 960	2087575.78	749009.89	0.17	0.95	0.05	0.26
STAKE 961	2087587.03	748960.43	0.16	0.93	0.04	0.24
STAKE 962	2087554.79	748958.34	0.25	1.42	0.14	0.81
STAKE 963	2086065.24	748808.73	0.22	1.23	0.10	0.59
STAKE 964	2086032.84	748809.21	0.39	2.22	0.30	1.69
STAKE 965	2086052.18	748838.42	0.41	2.33	0.32	1.80
STAKE 966	2086017.66	748836.11	0.49	2.77	0.40	2.26
STAKE 967	2086035.79	748864.62	0.19	1.07	0.07	0.41
STAKE 968	2085999.94	748865.59	0.20	1.12	0.08	0.46
STAKE 969	2086094.54	748862.11	0.27	1.50	0.16	0.90
STAKE 970	2086061.05	748862.41	0.23	1.31	0.12	0.68

309

**Appendix E**  
**HPGe Tier I and Tier II RSAL Calculations**

STAKE NUMBER	Easting	Northing	95% UCL Tier I SOR (Fstat)	95% UCL Tier II SOR (Fstat)	Best Fit Tier I SOR	Best Fit Tier II SOR
STAKE 971	2086108.80	748833.60	0.51	2.91	0.42	2.40
STAKE 972	2086076.46	748833.56	0.37	2.10	0.28	1.56
STAKE 973	2086125.64	748805.14	0.54	3.08	0.45	2.57
STAKE 974	2086094.17	748804.70	0.29	1.62	0.18	1.03
STAKE 975	2086197.51	748811.66	0.30	1.71	0.20	1.14
STAKE 976	2086159.10	748806.93	0.40	2.24	0.30	1.71
STAKE 977	2087577.45	748929.07	0.17	0.95	0.05	0.26
STAKE 978	2087606.93	748930.54	0.17	0.95	0.05	0.27
STAKE 979	2087533.36	748892.60	0.26	1.45	0.15	0.84
STAKE 980	2087586.64	748873.10	0.17	0.96	0.05	0.27
STAKE 981	2087523.00	748859.19	0.22	1.24	0.11	0.60
STAKE 982	2087562.50	748984.15	0.17	0.98	0.05	0.30
STAKE 983	2085961.45	748811.19	0.19	1.08	0.07	0.41
STAKE 984	2085993.20	748810.57	0.33	1.87	0.23	1.31
STAKE 985	2086149.45	748839.14	0.38	2.14	0.28	1.60
STAKE 986	2086172.77	748836.52	0.36	2.07	0.27	1.52
STAKE 987	2086219.88	748837.21	0.41	2.31	0.31	1.78
STAKE 988	2086249.69	748838.01	0.50	2.84	0.41	2.33
STAKE 989	2086235.08	748808.23	0.23	1.33	0.12	0.70
STAKE 990	2086367.63	748853.39	0.57	3.20	0.48	2.69
STAKE 991	2086391.09	748876.46	0.32	1.81	0.22	1.25
STAKE 992	2086335.75	748865.94	0.63	3.56	0.54	3.04
STAKE 993	2086348.72	748882.55	0.68	3.87	0.59	3.34
STAKE 994	2086302.93	748870.92	0.25	1.42	0.14	0.81
STAKE 995	2086325.51	748894.28	0.23	1.28	0.12	0.65
STAKE 996	2085771.64	748593.02	0.17	0.97	0.05	0.28
STAKE 997	2085797.29	748592.93	0.16	0.93	0.04	0.24
STAKE 998	2085736.48	748595.27	0.18	1.03	0.06	0.35
STAKE 999	2085748.47	748566.43	0.17	0.94	0.04	0.25



**Appendix E**  
**Borehole Radionuclide Data**

Borehole	EASTING	NORTHING	Material	Interval(ft)	unit_code	U-233/234 pCi/g	U-235 pCi/g	U-238 pCi/g	Pu 239/240 pCi/g	Am-241 pCi/g
90098	2085611	749212	asphalt	0.0-0.6	PCI/G	0.909	0.034	0.888	0.042	0.065
90198	2085686	749214	asphalt	0.0-0.5	PCI/G	0.842	0.039	0.919	0.029	0.015
90398	2085835	749215	asphalt	0.0-0.4	PCI/G	0.746	0.041	0.791	0.097	0.043
90698	2085685	749139	asphalt	0.0-0.5	PCI/G	0.672	0.038	0.607	0.001	0.016
90798	2085760	749137	asphalt	0.0-0.4	PCI/G	0.859	0.035	0.851	0.01	0.053
91198	2085685	749064	asphalt	0.0-0.4	PCI/G	0.782	0.012	0.736	0.047	0.03
91298	2085760	749062	asphalt	0.0-0.5	PCI/G	0.665	0.04	0.596	-0.002	0.048
91898	2085834	748990	asphalt	0.0-0.6	PCI/G	1.13	0.133	0.75	1.22	0.341
91998	2085909	748990	asphalt	0.0-0.5	PCI/G	0.663	0.049	0.598	0.034	0.022
96098	2085612	749211	bedrock	15.8-16.0	PCI/G	0.185	-0.006	0.215	0.042	-0.049
96198	2085687	749213	bedrock	15.5-15.8	PCI/G	0.412	0.047	0.707	0.25	0.036
96298	2085611	749135	bedrock	15.9-16.1	PCI/G	0.515	0.064	0.795	0.008	0.007
96398	2085610	749061	bedrock	16.0-16.2	PCI/G	0.731	0.073	0.69	0.041	0.007
96498	2085910	749141	bedrock	21.4-22.0	PCI/G	0.538	0.009	0.782	0.186	0.075
96598	2085867	749147	bedrock	22.7-22.9	PCI/G	0.904	0.063	0.842	0.044	0.017
96698	2085846	749128	bedrock	22.8-23.0	PCI/G	0.603	0.113	0.43	0.048	0
96898	2085713	749095	bedrock	16.2-16.4	PCI/G	0.402	0.048	0.388	0.357	0.207
96998	2085711	749038	bedrock	17.5-17.6	PCI/G	0.337	0.01	0.693	0.008	0.076
97098	2085611	748986	bedrock	16.2-16.5	PCI/G	0.444	0.017	0.618	0.032	0.054
97198	2085611	748911	bedrock	24.2-24.4	PCI/G	0.404	0.015	0.526	0.038	0
97298	2085930	748844	bedrock	17.9-18.1	PCI/G	0.358	0.054	0.748	0.019	0.068
90098	2085611	749212	fill	0.6-1.0	PCI/G	0.837	0.077	1.09	2.93	0.655
90198	2085686	749214	fill	0.5-0.9	PCI/G	0.913	0.033	0.857	2.62	0.536
90298	2085761	749211	fill	0.5-0.8	PCI/G	1.06	0.051	1.24	20.5	5.21
90398	2085835	749215	fill	0.4-0.8	PCI/G	0.837	0.029	0.939	1.37	0.309
90698	2085685	749139	fill	0.5-0.8	PCI/G	0.956	0.035	1.21	0.686	0.105
90798	2085760	749137	fill	0.4-0.8	PCI/G	1.08	0.079	1.08	8.13	1.7
91198	2085685	749064	fill	0.4-0.9	PCI/G	0.728	0.042	0.844	4.6	0.908
91298	2085760	749062	fill	0.5-1.0	PCI/G	1.12	0.066	1.24	7.45	1.41
91798	2085759	748989	fill	0.5-1.1	PCI/G	1.22	0.055	1.16	4.36	0.801
91898	2085834	748990	fill	0.6-1.1	PCI/G	2.02	0.487	2.77	558	126
91998	2085909	748990	fill	0.5-0.9	PCI/G	0.907	0.058	0.174	0.41	0.084
92298	2085760	748914	fill	0.5-0.9	PCI/G	0.997	0.066	1.2	34	6.43
91198	2085685	749064	native	11.1-11.6	PCI/G	0.412	0	0.613	0.01	0.02
91198	2085685	749064	native	15.1-15.5	PCI/G	0.467	0.04	0.574	0.073	0.028
91198	2085685	749064	native	18.6-19.1	PCI/G	0.48	0.031	0.603	0.009	0.007
91198	2085685	749064	native	19.8-20.2	PCI/G	0.578	0.037	0.698	0.047	0.077
91198	2085685	749064	native	7.4-7.7	PCI/G	0.315	0.009	0.341	0.009	0.007
92598	2085560	749064	native	12.0-12.5	PCI/G	0.379	0.027	0.4	0.056	0.041
92598	2085560	749064	native	16.0-16.75	PCI/G	0.353	0.027	0.437	0.033	-0.005
92598	2085560	749064	native	3.5-4.0	PCI/G	0.491	0.017	0.532	0.609	0.072
92598	2085560	749064	native	7.5-8.0	PCI/G	0.433	0.024	0.455	0.021	0.016
95998	2085893	749140	native	12.2-12.4	PCI/G	0.475	0.137	0.61	0.027	0.035
95998	2085893	749140	native	15.2-15.4	PCI/G	0.572	0.118	0.773	0.004	0
95998	2085893	749140	native	17.5-17.9	PCI/G	0.6	0.106	0.483	0.023	0
95998	2085893	749140	native	20.2-20.6	PCI/G	0.455	0.21	1.08	-0.019	0.016
95998	2085893	749140	native	4.8-5.0	PCI/G	0.315	0.194	0.657	-0.003	0
95998	2085893	749140	native	8.2-8.4	PCI/G	0.636	0.147	0.692	0	0.033
96098	2085612	749211	native	12.3-12.5	PCI/G	0.743	0.015	1.35	0.602	0.844
96098	2085612	749211	native	4.3-4.5	PCI/G	0.312	0.033	0.705	0.047	0.003
96098	2085612	749211	native	8.2-8.5	PCI/G	0.386	0	0.583	0.067	0.079
96198	2085687	749213	native	11.8-12.0	PCI/G	0.606	0.025	0.688	0.231	0.103
96198	2085687	749213	native	4.2-4.4	PCI/G	0.505	0.017	0.677	0.021	0.083
96198	2085687	749213	native	7.7-8.1	PCI/G	0.539	0.016	0.484	0.093	0.075
96298	2085611	749135	native	11.9-12.25	PCI/G	0.546	0.016	0.752	0.068	0.075
96298	2085611	749135	native	4.0-4.3	PCI/G	0.585	0.003	0.848	2.84	0.323
96298	2085611	749135	native	7.0-8.0	PCI/G	0.656	0.113	1.06	1.63	1.8
96398	2085610	749061	native	12.2-12.4	PCI/G	0.588	0.046	0.715	1.83	0.677
96398	2085610	749061	native	4.0-4.3	PCI/G	0.539	0.016	0.563	1.99	0.231
96398	2085610	749061	native	8.2-8.4	PCI/G	0.309	0.05	0.442	0.522	0.188
96498	2085910	749141	native	12.2-13.0	PCI/G	0.382	0.012	0.562	0.077	0.051
96498	2085910	749141	native	15.3-16.0	PCI/G	0.45	0.033	0.544	0.504	0.191
96498	2085910	749141	native	17.7-18.0	PCI/G	0.366	0.01	0.468	0.361	0.101
96498	2085910	749141	native	4.4-4.8	PCI/G	0.349	0.027	0.296	1.11	0.132
96498	2085910	749141	native	9.0-9.5	PCI/G	0.398	0.031	0.533	0.528	0.06
96598	2085867	749147	native	11.4-11.6	PCI/G	0.422	0.04	0.55	0.032	0.011
96598	2085867	749147	native	15.6-15.8	PCI/G	0.589	0.019	0.654	0.031	0.05

311

**Appendix E**  
**Borehole Radionuclide Data**

Borehole	EASTING	NORTHING	Material	Interval(ft)	unit_code	U-233/234 pCi/g	U-235 pCi/g	U-238 pCi/g	Pu 239/240 pCi/g	Am-241 pCi/g
96598	2085867	749147	native	18.4-18.6	PCI/G	0.43	0	0.449	0.027	0
96598	2085867	749147	native	4.0-4.2	PCI/G	0.417	0.033	0.389	0.071	0
96598	2085867	749147	native	8.2-8.4	PCI/G	0.413	0.016	0.398	-0.006	0.016
96698	2085846	749128	native	12.2-12.4	PCI/G	0.403	0.003	0.542	0.009	0.008
96698	2085846	749128	native	17.5-17.7	PCI/G	0.629	0.069	0.678	0.01	0.015
96698	2085846	749128	native	20.0-20.2	PCI/G	0.383	0.163	0.364	0.448	0.09
96698	2085846	749128	native	4.0-4.2	PCI/G	0.669	0.034	0.584	0.008	0
96698	2085846	749128	native	8.2-8.4	PCI/G	0.504	0.009	0.597	0.025	0.041
96798	2085866	749108	native	12.2-12.5	PCI/G	0.647	0.071	0.788	0.017	0.026
96798	2085866	749108	native	16.6-16.8	PCI/G	0.506	0.026	0.796	-0.008	0.036
96798	2085866	749108	native	20.0-20.4	PCI/G	0.578	0.055	0.52	0	0.053
96798	2085866	749108	native	4.2-4.4	PCI/G	1.4	0.097	1.46	0.017	0
96798	2085866	749108	native	8.2-8.4	PCI/G	0.281	0.019	0.693	0.047	0.018
96898	2085713	749095	native	12.1-12.3	PCI/G	0.389	0.016	0.325	0.121	0.295
96898	2085713	749095	native	4.2-4.4	PCI/G	0.479	0.003	0.54	0.348	0.098
96898	2085713	749095	native	8.2-8.4	PCI/G	0.435	0.009	0.495	0.459	0.044
96998	2085711	749038	native	12.2-12.4	PCI/G	0.614	0.032	0.69	0.013	-0.007
96998	2085711	749038	native	4.2-4.4	PCI/G	0.502	0.03	0.652	0.052	0.069
96998	2085711	749038	native	8.2-8.4	PCI/G	0.523	0.017	0.566	-0.006	0.002
97098	2085611	748986	native	12.2-12.4	PCI/G	0.82	0.009	0.783	0.198	0.05
97098	2085611	748986	native	4.0-4.2	PCI/G	0.472	-0.012	0.608	1.33	0.508
97098	2085611	748986	native	8.2-8.4	PCI/G	0.564	0.002	0.657	1.24	0.163
97198	2085611	748911	native	12.2-12.4	PCI/G	0.776	0.035	0.967	0.049	0.105
97198	2085611	748911	native	15.4-15.5	PCI/G	0.406	0	0.451	0.013	0.108
97198	2085611	748911	native	20.2-20.4	PCI/G	0.367	0.047	0.531	0.163	0.037
97198	2085611	748911	native	4.2-4.4	PCI/G	0.613	0.063	0.697	0.118	0.085
97198	2085611	748911	native	7.0-7.3	PCI/G	0.573	0.014	0.557	0.482	0.153
97298	2085930	748844	native	12.2-12.4	PCI/G	0.592	0.053	0.512	0.098	0.067
97298	2085930	748844	native	16.2-16.4	PCI/G	0.387	0.058	0.423	0.157	0.046
97298	2085930	748844	native	4.4-4.6	PCI/G	0.441	0.012	0.779	0.023	0.032
97298	2085930	748844	native	8.2-8.4	PCI/G	0.673	0.031	0.617	0.009	0.016
97698	2085880	749135	native	11.6-11.8	PCI/G	0.511	0.042	0.695	0.019	0
97698	2085880	749135	native	13.9-14.1	PCI/G	0.38	0.021	0.62	0	0
97698	2085880	749135	native	16.1-16.3	PCI/G	0.442	0.122	0.687	0.018	0.034
97698	2085880	749135	native	18.0-18.2	PCI/G	0.527	0.144	0.977	0.048	0.018
97698	2085880	749135	native	19.8-20.0	PCI/G	0.473	-0.01	0.486	0	0
97698	2085880	749135	native	4.2-4.6	PCI/G	0.519	0.122	0.5	0.06	0.011
97698	2085880	749135	native	8.6-8.8	PCI/G	0.4	0.08	0.538	0.021	0.039
90098	2085611	749212	native 1	1.0-1.5	PCI/G	1.14	0.071	1.68	4.85	0.958
90198	2085686	749214	native 1	0.9-1.4	PCI/G	1.58	0.384	1.9	711	87
90298	2085761	749211	native 1	0.8-1.1	PCI/G	3.11	0.213	8.5	9110	1510
90398	2085835	749215	native 1	0.8-1.3	PCI/G	0.748	0.026	0.894	3.01	0.592
90498	2085910	749216	native 1	0.7-1.2	PCI/G	1.37	0.158	2.68	284	50.4
90598	2085610	749137	native 1	1.1-1.6	PCI/G	0.842	0.038	1.59	142	33.9
90698	2085685	749139	native 1	0.8-1.5	PCI/G	5.14	0.577	7.92	10670	1880
90798	2085760	749137	native 1	0.8-1.5	PCI/G	0.973	0.134	1.91	260	69.5
90898	2085835	749140	native 1	0.9-1.4	PCI/G	3.56	0.169	5.21	685	158
90998	2085910	749141	native 1	0.8-1.3	PCI/G	10.8	0.566	26.8	1210	268
91098	2085610	749062	native 1	1.4-1.9	PCI/G	0.749	0.091	1.23	2500	377
91198	2085685	749064	native 1	0.9-1.3	PCI/G	0.848	0.032	1.54	125	21.8
91298	2085760	749062	native 1	1.0-1.5	PCI/G	0.798	0.066	1.51	242	36.3
91398	2085834	749065	native 1	0.8-1.3	PCI/G	178	16.9	780	6600	1210
91498	2085909	749066	native 1	0.8-1.3	PCI/G	6.18	1.74	15.2	768	146
91598	2085610	748987	native 1	1.5-2.0	PCI/G	19.8	7.2	28.2	152260	31670
91698	2085684	748989	native 1	0.9-1.4	PCI/G	1.83	-0.913	0.913	389	3930
91798	2085759	748989	native 1	1.1-1.6	PCI/G	0.838	0.045	1.72	7960	535
91898	2085834	748990	native 1	1.1-1.6	PCI/G	10.7	2.52	13.2	2420	554
91998	2085909	748990	native 1	0.9-1.4	PCI/G	2.53	0.961	2.69	581	116
92098	2085609	748913	native 1	0.9-1.4	PCI/G	1.3	0.038	1.03	0.969	12.4
92298	2085760	748914	native 1	0.9-1.6	PCI/G	0.764	0.029	0.866	18	3.88
92198	2085684	748914	native 1	0.7-1.2	PCI/G	1.37	0.048	0.62	104	19.8
92398	2085834	748915	native 1	1.3-1.8	PCI/G	0.797	0.073	0.656	10	1.41
92498	2085909	748915	native 1	1.1-1.6	PCI/G	0.758	0.092	1.1	474	59.5
92598	2085560	749064	native 1	0.0-0.2	PCI/G	0.966	0.18	1.15	93.6	16.7
92698	2085551	748977	native 1	0.0-0.4	PCI/G	0.788	0.062	0.789	5.83	0.99
92798	2085553	748827	native 1	0.0-0.4	PCI/G	1.05	0.045	0.852	3.49	0.565
92898	2085703	748830	native 1	0.5-1.0	PCI/G	1	0.038	0.994	0.817	0.154

**Appendix E**  
**Borehole Radionuclide Data**

Borehole	EASTING	NORTHING	Material	Interval(ft)	unit_code	U-233/234 pCi/g	U-235 pCi/g	U-238 pCi/g	Pu 239/240 pCi/g	Am-241 pCi/g
92998	2085853	748830	native 1	0.0-0.5	PCI/G	0.418	0.016	0.494	90.2	15.6
93098	2086005	748817	native 1	0.0-0.5	PCI/G	0.866	0.017	0.863	37.6	7.86
93198	2086167	748839	native 1	0.0-0.5	PCI/G	1.29	-0.196	2.53	808	128
93298	2085755	748671	native 1	0.0-0.5	PCI/G	0.963	0.051	1.42	45.9	9.3
93398	2085857	748698	native 1	0.0-0.5	PCI/G	1.34	0.033	1.33	19.1	3.39
93498	2086198	748702	native 1	0.0-0.5	PCI/G	1.05	0.066	1.56	326	56.1
93598	2085978	748977	native 1	0.0-0.4	PCI/G	0.893	0.169	1.82	417	80.5
93698	2086153	748988	native 1	0.0-0.5	PCI/G	1.13	0.086	3.78	1170	225
93798	2086300	748976	native 1	0.0-0.45	PCI/G	1.27	0.123	0.538	472	75.6
93898	2086406	749003	native 1	0.0-0.5	PCI/G	0.803	0.017	1.16	196	35.9
93998	2086000	749123	native 1	0.0-0.5	PCI/G	0.98	0.053	1.15	39.3	8
94098	2086128	749117	native 1	0.0-0.4	PCI/G	35.8	4.17	75.7	14950	3140
94198	2086298	749123	native 1	0.0-0.4	PCI/G	1.13	0.051	1.66	229	35.7
94298	2086438	749112	native 1	0.0-0.5	PCI/G	0.859	0.033	1.03	56.3	10
94398	2085550	749129	native 1	0.0-0.3	PCI/G	1.06	0.032	1.06	2.32	0.497
94498	2085552	749264	native 1	0.0-0.3	PCI/G	0.949	0.096	0.949	4.9	0.839
94598	2085703	749265	native 1	0.0-0.5	PCI/G	0.801	0.014	0.995	19.2	2.91
94698	2085852	749265	native 1	0.0-0.45	PCI/G	0.822	0.034	0.905	9.32	2.14
94798	2086000	749266	native 1	0.0-0.5	PCI/G	0.587	0.064	0.795	30.6	5.05
94898	2086149	749243	native 1	0.0-0.4	PCI/G	0.798	0.056	1.32	362	80.8
94998	2086298	749244	native 1	0.0-0.5	PCI/G	0.997	0.085	1.31	162	36.7
95098	2086447	749243	native 1	0.0-0.5	PCI/G	1	-0.012	0.993	18.8	3.34
95198	2086149	749188	native 1	0.0-0.5	PCI/G	3.28	0.122	8.66	3300	880
95298	2086066	749123	native 1	0.0-0.5	PCI/G	0.78	0.062	0.827	10.6	1.96
95398	2086211	749120	native 1	0.0-0.5	PCI/G	1.94	0.188	6.34	978	182
95498	2086078	748987	native 1	0.0-0.45	PCI/G	0.772	0.022	1.01	49.8	8.51
95598	2086229	748984	native 1	0.0-0.5	PCI/G	1.14	0.055	2.74	858	176
95698	2086077	749248	native 1	0.0-0.5	PCI/G	0.765	0.046	1.54	135	26.9
95798	2086148	749268	native 1	0.0-0.5	PCI/G	0.911	0.049	0.962	40.3	6.69
95898	2086219	749244	native 1	0.0-0.5	PCI/G	0.94	0.056	1.3	27.3	5.03
97398	2086096	748827	native 1	0.0-0.5	PCI/G	0.884	0.116	0.917	278	45
97498	2086182	748770	native 1	0.0-0.45	PCI/G	0.762	0.004	1.14	82.7	11.6
97598	2086247	748845	native 1	0.0-0.5	PCI/G	1.2	0.018	1.47	75.7	15.7
90098	2085611	749212	native 2	1.5-2.0	PCI/G	0.587	0.027	0.598	0.135	0.031
90198	2085686	749214	native 2	1.4-1.9	PCI/G	0.491	0.022	0.651	0.656	0.122
90298	2085761	749211	native 2	1.1-1.7	PCI/G	1.63	0.105	3.5	25	6.26
90398	2085835	749215	native 2	1.3-1.8	PCI/G	0.565	0.011	0.594	0.403	0.306
90498	2085910	749216	native 2	1.2-1.7	PCI/G	0.721	0.034	0.87	50.1	9.35
90598	2085610	749137	native 2	1.6-2.1	PCI/G	0.502	0.029	0.58	0.224	0.05
90698	2085685	749139	native 2	1.5-2.1	PCI/G	0.383	0.018	0.394	12.3	1.89
90798	2085760	749137	native 2	1.5-2.0	PCI/G	0.36	0.02	0.397	6.22	0.917
90898	2085835	749140	native 2	1.4-1.9	PCI/G	0.324	0.032	0.379	0.848	0.296
90998	2085910	749141	native 2	1.3-1.8	PCI/G	2.85	0.227	15.7	13.6	2.4
91098	2085610	749062	native 2	1.9-2.4	PCI/G	0.914	0.056	0.967	21.7	3.93
91198	2085685	749064	native 2	1.3-1.9	PCI/G	0.39	0.012	0.304	5.52	0.744
91298	2085760	749062	native 2	1.5-2.0	PCI/G	0.284	0.007	0.319	1.49	0.229
91398	2085834	749065	native 2	1.3-1.8	PCI/G	0.436	0.065	0.721	201	10.3
91498	2085909	749066	native 2	1.3-1.8	PCI/G	0.723	0.045	2.35	9.1	1.69
91598	2085610	748987	native 2	2.0-2.5	PCI/G	0.977	0.137	1.12	167	33.2
91698	2085684	748989	native 2	1.4-1.9	PCI/G	1.45	0.252	1.89	0.937	7.05
91798	2085759	748989	native 2	1.6-2.0	PCI/G	0.537	0.046	0.771	5.98	1.08
91898	2085834	748990	native 2	1.6-2.1	PCI/G	1.65	0.379	1.38	212	29.2
91998	2085909	748990	native 2	1.4-1.9	PCI/G	11.4	6.57	8.51	1480	256
92098	2085609	748913	native 2	1.4-1.9	PCI/G	0.904	0.022	0.72	0.381	0.172
92198	2085684	748914	native 2	1.2-1.7	PCI/G	0.04	0.05	0.824	0.16	0.15
92298	2085760	748914	native 2	1.6-2.0	PCI/G	0.963	0.043	0.996	1.79	0.28
92398	2085834	748915	native 2	1.8-2.3	PCI/G	0.652	0.039	0.69	2.93	0.591
92498	2085909	748915	native 2	1.6-2.1	PCI/G	0.56	0.045	0.54	0.408	0.055
92598	2085560	749064	native 2	0.2-1.0	PCI/G	0.726	0.03	0.832	14	2.64
92698	2085551	748977	native 2	0.4-0.9	PCI/G	0.442	0.022	0.516	1.22	0.345
92798	2085553	748827	native 2	0.4-0.9	PCI/G	0.621	0.011	0.694	0.303	0.049
92898	2085703	748830	native 2	1.0-1.5	PCI/G	0.926	0.051	0.972	0.932	0.177
92998	2085853	748830	native 2	0.5-1.0	PCI/G	0.607	0.014	0.551	5.76	1.1
93098	2086005	748817	native 2	0.5-1.0	PCI/G	0.961	0.066	0.877	6.1	1.33
93198	2086167	748839	native 2	0.5-1.0	PCI/G	0.941	0.028	1.29	62.8	9.88
93298	2085755	748671	native 2	0.5-1.0	PCI/G	0.825	-0.007	0.854	0.906	0.114
93398	2085857	748698	native 2	0.5-1.0	PCI/G	1.27	0.046	1.25	1.87	0.45

**Appendix E**  
**Borehole Radionuclide Data**

Borehole	EASTING	NORTHING	Material	Interval(ft)	unit_code	U-233/234 pCi/g	U-235 pCi/g	U-238 pCi/g	Pu 239/240 pCi/g	Am-241 pCi/g
93498	2086198	748702	native 2	0.5-1.0	PCI/G	0.694	0.066	1.09	9.01	1.67
93598	2085978	748977	native 2	0.4-0.8	PCI/G	0.499	0.015	0.522	9.34	1.25
93698	2086153	748988	native 2	0.5-1.0	PCI/G	0.511	0.032	0.764	49.5	9.95
93798	2086300	748976	native 2	0.45-0.9	PCI/G	0.413	0.033	0.369	4.12	0.957
93898	2086406	749003	native 2	0.5-1.0	PCI/G	0.915	0.035	1.15	34.6	5.46
93998	2086000	749123	native 2	0.5-1.0	PCI/G	0.492	0.029	0.541	4.64	0.668
94098	2086128	749117	native 2	0.4-0.8	PCI/G	0.679	0.051	0.988	28.6	4.96
94198	2086298	749123	native 2	0.4-0.8	PCI/G	0.569	0.028	0.545	13.9	2.51
94298	2086438	749112	native 2	0.5-1.0	PCI/G	0.862	0.049	0.911	25.4	2.93
94398	2085550	749129	native 2	0.3-0.7	PCI/G	0.74	0.014	0.565	0.149	0.052
94498	2085552	749264	native 2	0.3-0.8	PCI/G	0.876	0.061	0.729	1.26	0.302
94598	2085703	749265	native 2	0.5-1.0	PCI/G	0.918	0.038	1.03	11.4	2.44
94698	2085852	749265	native 2	0.45-0.9	PCI/G	0.662	0.072	0.811	23.3	3.43
94798	2086000	749266	native 2	0.5-1.0	PCI/G	0.725	0.066	0.883	27	4.47
94898	2086149	749243	native 2	0.4-0.8	PCI/G	1.07	0.074	2.3	785	209
94998	2086298	749244	native 2	0.5-1.0	PCI/G	1.19	0.023	1.5	192	44.4
95098	2086447	749243	native 2	0.5-1.0	PCI/G	0.725	0.002	0.875	0.814	0.096
95198	2086149	749188	native 2	0.5-1.0	PCI/G	2.05	0.153	6.79	1820	406
95298	2086066	749123	native 2	0.5-1.0	PCI/G	0.855	0.077	1.06	37.6	8.42
95398	2086211	749120	native 2	0.5-1.0	PCI/G	1.63	0.087	5.07	683	136
95498	2086078	748987	native 2	0.45-0.9	PCI/G	1.2	0.047	2.97	669	170
95598	2086229	748984	native 2	0.5-1.0	PCI/G	0.905	0.029	1.24	412	89.5
95698	2086077	749248	native 2	0.5-1.0	PCI/G	0.412	0.018	0.397	1.9	0.329
95798	2086148	749268	native 2	0.5-1.0	PCI/G	1.18	0.108	1.2	3.98	0.768
95898	2086219	749244	native 2	0.5-1.0	PCI/G	0.905	0.049	0.896	15.8	3.16
97398	2086096	748827	native 2	0.5-1.0	PCI/G	0.933	0.063	1.06	4.5	0.72
97498	2086182	748770	native 2	0.45-0.9	PCI/G	1.09	0.127	1.01	0.489	0.082
97598	2086247	748845	native 2	0.5-1.0	PCI/G	0.9	0.118	1.87	389	72.5
90098	2085611	749212	native 3	2.0-2.5	PCI/G	0.746	0.026	0.853	0.006	-0.005
90198	2085686	749214	native 3	1.9-2.4	PCI/G	0.444	0.05	0.567	0.081	0.014
90298	2085761	749211	native 3	1.7-2.4	PCI/G	1.68	0.1	4	3.23	0.561
90398	2085835	749215	native 3	1.8-2.3	PCI/G	0.393	0.026	0.456	0.044	0.043
90498	2085910	749216	native 3	1.7-2.2	PCI/G	0.38	0.017	0.373	0.482	0.111
90598	2085610	749137	native 3	2.1-2.6	PCI/G	0.485	0.008	0.557	0.379	0.031
90698	2085685	749139	native 3	2.1-2.8	PCI/G	0.507	0.029	0.526	0.227	0.07
90798	2085760	749137	native 3	2.0-2.5	PCI/G	0.364	0.021	0.456	0.202	0.113
90898	2085835	749140	native 3	1.9-2.4	PCI/G	0.501	0.028	0.492	0.032	0.089
90998	2085910	749141	native 3	1.8-2.3	PCI/G	3.12	0.274	9.1	48.4	9.24
91098	2085610	749062	native 3	2.4-2.9	PCI/G	1.15	0.059	1.32	14.4	2.86
91198	2085685	749064	native 3	1.9-2.5	PCI/G	0.263	0.022	0.368	0.934	0.098
91298	2085760	749062	native 3	2.0-2.6	PCI/G	0.495	0.022	0.524	0.067	0.278
91398	2085834	749065	native 3	1.8-2.3	PCI/G	0.296	0.013	0.315	0.131	0.245
91498	2085909	749066	native 3	1.8-2.3	PCI/G	0.31	0.007	0.367	0.327	0.162
91598	2085610	748987	native 3	2.5-3.0	PCI/G	0.472	0.028	0.546	12.2	1.87
91698	2085684	748989	native 3	1.9-2.4	PCI/G	0.645	0.031	0.745	0.292	0.024
91798	2085759	748989	native 3	2.0-2.4	PCI/G	0.38	0.023	0.516	5.13	1.1
91898	2085834	748990	native 3	2.1-2.6	PCI/G	0.554	0.076	0.577	29.9	2.94
91998	2085909	748990	native 3	1.9-2.4	PCI/G	0.659	0.066	0.625	3.39	0.605
92098	2085609	748913	native 3	1.9-2.4	PCI/G	0.352	0.358	0.358	0.206	0.112
92198	2085684	748914	native 3	1.7-2.2	PCI/G	0.01	0.017	0.1	0.15	0.023
92298	2085760	748914	native 3	2.0-2.3	PCI/G	1.06	0.043	1.22	0.023	0.019
92398	2085834	748915	native 3	2.3-2.8	PCI/G	0.489	0.033	0.396	0.433	0.06
92498	2085909	748915	native 3	2.1-2.6	PCI/G	0.27	0.05	0.29	0.059	0.124
92598	2085560	749064	native 3	1.0-1.5	PCI/G	0.806	0.038	0.888	0.936	0.197
92698	2085551	748977	native 3	0.9-1.4	PCI/G	0.946	0.041	0.786	0.071	0.168
92798	2085553	748827	native 3	0.9-1.4	PCI/G	0.354	0.013	0.458	0.09	0.06
92898	2085703	748830	native 3	1.5-2.0	PCI/G	0.769	0.039	0.77	0.137	0.053
92998	2085853	748830	native 3	1.0-1.5	PCI/G	0.766	0.023	0.896	1.75	0.216
93098	2086005	748817	native 3	1.0-1.5	PCI/G	1.02	0.099	0.76	11.8	2.22
93198	2086167	748839	native 3	1.0-1.5	PCI/G	0.934	0.055	0.974	28	4.15
93298	2085755	748671	native 3	1.0-1.5	PCI/G	0.706	0.018	0.776	0.322	-0.012
93398	2085857	748698	native 3	1.0-1.5	PCI/G	1.2	0.07	1.14	5.46	0.818
93498	2086198	748702	native 3	1.0-1.5	PCI/G	0.823	0.064	1.15	5.55	1
93598	2085978	748977	native 3	0.8-1.2	PCI/G	0.556	0.003	0.632	3.64	0.447
93698	2086153	748988	native 3	1.0-1.5	PCI/G	0.372	0.012	0.401	54.1	8.39
93798	2086300	748976	native 3	0.9-1.35	PCI/G	0.367	0.04	0.308	0.154	0.097
93898	2086406	749003	native 3	1.0-1.5	PCI/G	0.761	0.049	0.776	17.4	3.21

314

**Appendix E**  
**Borehole Radionuclide Data**

Borehole	EASTING	NORTHING	Material	Interval(ft)	unit_code	U-233/234 pCi/g	U-235 pCi/g	U-238 pCi/g	Pu 239/240 pCi/g	Am-241 pCi/g
93998	2086000	749123	native 3	1.0-1.5	PCI/G	0.544	0.042	0.655	0.058	0.047
94098	2086128	749117	native 3	0.8-1.2	PCI/G	0.671	0.036	0.769	19.2	2.96
94198	2086298	749123	native 3	0.8-1.2	PCI/G	0.316	0.017	0.341	0.346	0.059
94298	2086438	749112	native 3	1.0-1.5	PCI/G	0.696	0.05	0.738	0.278	0.164
94398	2085550	749129	native 3	0.7-1.1	PCI/G	0.677	0.042	0.713	0.257	0.048
94498	2085552	749264	native 3	0.8-1.3	PCI/G	0.423	0.025	0.468	0.058	0.027
94598	2085703	749265	native 3	1.0-1.5	PCI/G	0.636	0.025	0.567	1.04	0.165
94698	2085852	749265	native 3	0.9-1.35	PCI/G	0.568	0.04	0.617	2.1	0.415
94798	2086000	749266	native 3	1.0-1.5	PCI/G	0.588	0.037	0.512	0.521	0.245
94898	2086149	749243	native 3	0.8-1.2	PCI/G	1.48	0.124	3.12	247	54.4
94998	2086298	749244	native 3	1.0-1.5	PCI/G	0.843	0.017	1.22	26.6	4.56
95098	2086447	749243	native 3	1.0-1.5	PCI/G	0.426	0.023	0.618	1.52	0.311
95198	2086149	749188	native 3	1.0-1.5	PCI/G	1.29	0.138	2.71	115	25.8
95298	2086066	749123	native 3	1.0-1.5	PCI/G	0.956	0.037	0.944	45.1	8.92
95398	2086211	749120	native 3	1.0-1.5	PCI/G	0.841	0.062	1.19	46.5	8.89
95498	2086078	748987	native 3	0.9-1.35	PCI/G	0.827	0.063	1.76	156	29.5
95598	2086229	748984	native 3	1.0-1.5	PCI/G	0.489	0.015	0.572	38.1	5.93
95698	2086077	749248	native 3	1.0-1.5	PCI/G	0.544	0.009	0.622	10.7	2.07
95798	2086148	749268	native 3	1.0-1.5	PCI/G	0.562	-0.013	1.02	1.34	0.273
95898	2086219	749244	native 3	1.0-1.5	PCI/G	0.805	0.003	0.751	11.4	2.49
97398	2086096	748827	native 3	1.0-1.5	PCI/G	0.818	0.063	0.892	0.423	0.123
97498	2086182	748770	native 3	0.9-1.35	PCI/G	0.905	0.082	1.21	0.265	0.016
97598	2086247	748845	native 3	1.0-1.5	PCI/G	1.01	-0.007	1.23	33.2	5.5
90098	2085611	749212	native 4	2.5-3.0	PCI/G	0.592	0.041	0.515	0.016	-0.001
90198	2085686	749214	native 4	2.4-2.9	PCI/G	0.76	0.051	0.841	0.044	0.014
90298	2085761	749211	native 4	2.4-3.0	PCI/G	0.576	0.048	0.633	0.747	0.25
90398	2085835	749215	native 4	2.3-2.8	PCI/G	0.629	0.042	0.604	0.085	0.76
90498	2085910	749216	native 4	2.2-2.7	PCI/G	0.328	0.021	0.365	0.046	0.02
90598	2085610	749137	native 4	2.6-3.1	PCI/G	0.408	0.026	0.486	0.784	0.071
90798	2085760	749137	native 4	2.5-3.1	PCI/G	0.311	0.014	0.334	2.65	0.67
90898	2085835	749140	native 4	2.4-2.9	PCI/G	0.499	0.02	0.459	0.029	0.079
90998	2085910	749141	native 4	2.3-2.8	PCI/G	0.815	0.082	1.24	3.7	0.736
91098	2085610	749062	native 4	2.9-3.4	PCI/G	0.462	0.012	0.439	5.5	1.09
91198	2085685	749064	native 4	2.5-3.1	PCI/G	0.335	0.014	0.403	0.659	0.116
91398	2085834	749065	native 4	2.3-2.8	PCI/G	0.408	0.044	0.354	0.56	0.322
91498	2085909	749066	native 4	2.3-2.8	PCI/G	0.403	0.023	0.52	0.09	0.078
91598	2085610	748987	native 4	3.0-3.5	PCI/G	0.27	0.022	0.187	17.6	3.38
91698	2085684	748989	native 4	2.4-2.9	PCI/G	0.908	0.039	0.791	0.697	0.142
91898	2085834	748990	native 4	2.6-3.1	PCI/G	0.357	0.035	0.39	1.08	0.286
91998	2085909	748990	native 4	2.4-2.9	PCI/G	0.34	0.021	0.411	1.9	0.29
92098	2085609	748913	native 4	2.4-2.9	PCI/G	0.362	0.018	0.493	0.087	0.212
92198	2085684	748914	native 4	2.2-2.7	PCI/G	0.558	0.012	0.58	0.036	0.008
92398	2085834	748915	native 4	2.8-3.3	PCI/G	0.455	0.016	0.452	0.119	0.038
92498	2085909	748915	native 4	2.6-3.1	PCI/G	0.422	0.042	0.502	0.034	0.092
92598	2085560	749064	native 4	1.5-2.0	PCI/G	0.586	0.023	0.543	0.84	0.152
92698	2085551	748977	native 4	1.4-1.9	PCI/G	0.895	0.014	0.857	0.17	0.14
92798	2085553	748827	native 4	1.4-1.9	PCI/G	0.355	0.016	0.393	0.058	0.086
92898	2085703	748830	native 4	2.0-2.4	PCI/G	0.642	0.051	0.626	0.071	0.049
92998	2085853	748830	native 4	1.5-2.0	PCI/G	0.684	0.027	0.647	4.33	0.824
93098	2086005	748817	native 4	1.5-2.0	PCI/G	0.773	0	0.645	2.33	0.361
93198	2086167	748839	native 4	1.5-2.0	PCI/G	0.826	0.032	1.06	35.6	5.82
93298	2085755	748671	native 4	1.5-2.0	PCI/G	0.595	0.034	0.626	0.135	-0.045
93398	2085857	748698	native 4	1.5-2.0	PCI/G	1.32	0.102	1.13	0.073	-0.006
93498	2086198	748702	native 4	1.5-2.0	PCI/G	0.943	0.003	1.08	1.24	0.088
93598	2085978	748977	native 4	1.2-1.4	PCI/G	0.456	0.029	0.477	2.83	0.369
93698	2086153	748988	native 4	1.5-2.0	PCI/G	0.334	0.015	0.343	1.72	0.342
93798	2086300	748976	native 4	1.35-1.8	PCI/G	0.371	0.025	0.311	1.03	0.307
93898	2086406	749003	native 4	1.5-2.0	PCI/G	0.385	0.033	0.576	14.3	2.07
93998	2086000	749123	native 4	1.5-2.0	PCI/G	0.637	0.014	0.548	0.037	0.358
94098	2086128	749117	native 4	1.2-1.5	PCI/G	0.522	-0.047	1.11	54	5.25
94198	2086298	749123	native 4	1.2-1.6	PCI/G	0.464	0.017	0.36	2.86	0.293
94298	2086438	749112	native 4	1.5-2.0	PCI/G	0.686	0.034	0.773	0.471	0.026
94398	2085550	749129	native 4	1.1-1.4	PCI/G	0.668	0.032	0.702	0.267	0.024
94498	2085552	749264	native 4	1.3-1.8	PCI/G	0.37	0.047	0.449	0.014	0.019
94598	2085703	749265	native 4	1.5-2.0	PCI/G	0.802	0.043	0.813	0.081	0.032
94698	2085852	749265	native 4	1.35-1.8	PCI/G	0.651	0.055	0.878	5.62	1.16
94798	2086000	749266	native 4	1.5-2.0	PCI/G	0.483	0.016	0.611	0.121	0.051

**Appendix E**  
**Borehole Radionuclide Data**

Borehole	EASTING	NORTHING	Material	Interval(ft)	unit_code	U-233/234 pCi/g	U-235 pCi/g	U-238 pCi/g	Pu 239/240 pCi/g	Am-241 pCi/g
94898	2086149	749243	native 4	1.2-1.7	PCI/G	0.946	0.079	1.97	34.5	7.63
94998	2086298	749244	native 4	1.5-2.0	PCI/G	0.491	0.048	0.685	6.95	1.33
95098	2086447	749243	native 4	1.5-2.0	PCI/G	0.652	0.062	0.664	0.57	0.152
95198	2086149	749188	native 4	1.5-2.0	PCI/G	0.523	0.031	0.716	5.32	0.969
95298	2086066	749123	native 4	1.5-2.0	PCI/G	0.562	0.023	0.595	1.31	0.238
95398	2086211	749120	native 4	1.5-2.0	PCI/G	0.713	0.032	0.813	34.5	6.66
95498	2086078	748987	native 4	1.35-1.75	PCI/G	0.52	0.034	0.593	12.3	2.26
95598	2086229	748984	native 4	1.5-2.0	PCI/G	0.359	-0.011	0.265	1.37	0.272
95698	2086077	749248	native 4	1.5-2.0	PCI/G	0.477	0.017	0.505	4.49	1.06
95798	2086148	749268	native 4	1.5-2.0	PCI/G	0.654	0.017	0.792	0.816	0.13
95898	2086219	749244	native 4	1.5-2.0	PCI/G	0.538	0.041	0.552	20.1	4.46
97398	2086096	748827	native 4	1.5-2.0	PCI/G	0.76	0.044	0.917	0.549	0.169
97498	2086182	748770	native 4	1.35-1.8	PCI/G	0.617	0.04	0.559	0	0.032
97598	2086247	748845	native 4	1.5-2.0	PCI/G	0.978	0.077	0.89	0.913	0.194

Appendix E  
Real VOC Data

Borehole	Sample Interval	Material	RIN/Event/Bottle	lab_result_qualifier_codes	1,1,1,2-TETRACHLOROETHANE (ug/kg)	1,1,1-TRICHLOROETHANE (ug/kg)	1,1,2,2-TETRACHLOROETHANE (ug/kg)	1,1,2-TRICHLOROETHANE (ug/kg)	1,1,2-Trichlorotrifluoroethane (ug/kg)
90998	3.8-4.0	native	98A2015-001.010						
91198	11.6-11.9	native	98A1091-001.035						
91198	15.5-15.8	native	98A1091-001.036						
91198	19.1-19.5	native	98A1091-001.037						
91198	19.5-19.8	bedrock	98A1091-001.038						
91198	3.1-3.4	native	98A1091-001.033						
91198	7.7-8.0	native	98A1091-001.034						
92598	12.0-12.5	native	98A1092-001.035						
92598	16.0-16.75	bedrock	98A1092-001.036						
92598	3.5-4.0	native	98A1092-001.033						
92598	7.5-8.0	native	98A1092-001.034						
95998	12.4-12.8	native	99A7799-003.002						
95998	14.8-15.2	native	99A7799-004.002						
95998	17.7-18.2	native	99A7799-005.002						
95998	24.6-25.0	bedrock	99A7799-006.002						
95998	5.0-5.6	native	99A7799-001.002						
95998	8.4-8.8	native	99A7799-002.002						
96298	16.1-16.5	bedrock	99A3210-004.017						
96498	13.3-13.5	native	99A3210-001.015						
96498	16.0-16.5	native	99A3210-001.016						
96498	18.0-18.6	native	99A3210-001.017						
96498	22.0-22.5	bedrock	99A3210-001.018						
96498	4.8-5.2	native	99A3210-001.013						
96498	9.5-10.0	native	99A3210-001.014						
96598	11.6-12.0	native	99A6817-003.002						
96598	15.2-15.6	native	99A6817-004.002						
96598	18.6-18.9	native	99A6817-005.002						
96598	22.3-22.7	bedrock	99A6817-006.002						
96598	4.2-4.6	native	99A6817-001.002						
96598	8.4-8.8	native	99A6817-002.002						
96698	12.4-12.8	native	99A6649-003.002						
96698	17.7-18.3	native	99A7930-001.002						
96698	20.2-20.6	native	99A7930-002.002						
96698	22.4-22.8	bedrock	99A7930-003.002						
96698	4.2-4.6	native	99A6649-001.002						
96698	8.2-8.6	native	99A6649-002.002						
96798	12.5-12.9	native	99A6650-003.002						
96798	16.0-16.4	native	99A6650-004.002						
96798	20.4-20.8	native	99A6650-005.002						
96798	8.4-8.8	native	99A6650-002.002						
96898	12.3-12.6	native	99A6307-003.002						
96898	17.1-17.4	bedrock	99A6307-004.002						
96898	4.4-4.7	native	99A6307-001.002						



Appendix E  
Real VOC Data

Borehole	Sample Interval	Material	RIN/Event/Bottle	lab_result_qualifier_codes	1,1,1,2-TETRACHLOROETHANE (ug/kg)	1,1,1-TRICHLOROETHANE (ug/kg)	1,1,2,2-TETRACHLOROETHANE (ug/kg)	1,1,2-TRICHLOROETHANE (ug/kg)	1,1,2-Trichlorotrifluoroethane (ug/kg)
96898	8.4-8.7	native	99A6307-002.002						
96998	4.4-4.8	native	99A6824-001.002						
96998	8.4-8.8	native	99A6824-002.002						
97198	20.4-20.8	native	99A4102-002.015						
97198	24.4-24.8	bedrock	99A4102-002.018						
97298	12.4-12.8	native	99A6825-003.002						
97298	16.4-17.0	native	99A6825-004.002						
97298	17.7-18.2	bedrock	99A6825-005.002						
97298	4.0-4.4	native	99A6825-001.002						
97298	8.4-8.8	native	99A6825-002.002						
97698	11.2-11.6	native	99A8275-003.002						
97698	13.5-13.9	native	99A8275-004.002						
97698	16.3-16.7	native	99A8275-005.002						
97698	18.2-18.8	native	99A8275-008.002						
97698	19.4-19.8	native	99A8275-009.002						
97698	4.6-5.8	native	99A8275-001.002						
97698	8.2-8.6	native	99A8275-002.002						
90998	3.8-4.0	native	98A2015-001.010	B					
91198	11.6-11.9	native	98A1091-001.035	B					
91198	15.5-15.8	native	98A1091-001.036	B					
91198	19.1-19.5	native	98A1091-001.037	B					
91198	19.5-19.8	bedrock	98A1091-001.038	B					
91198	7.7-8.0	native	98A1091-001.034	B					
92598	12.0-12.5	native	98A1092-001.035	B					
92598	16.0-16.75	bedrock	98A1092-001.036	B					
92598	3.5-4.0	native	98A1092-001.033	B					
92598	7.5-8.0	native	98A1092-001.034	B					
97698	11.2-11.6	native	99A8275-003.002	B					
97698	13.5-13.9	native	99A8275-004.002	B					
97698	16.3-16.7	native	99A8275-005.002	B					
97698	18.2-18.8	native	99A8275-008.002	B					
95998	24.6-25.0	bedrock	99A7799-006.002	BJ					
96598	15.2-15.6	native	99A6817-004.002	BJ					
97198	24.4-24.8	bedrock	99A4102-002.018	BJ					
97698	11.2-11.6	native	99A8275-003.002	BJ					
97698	13.5-13.9	native	99A8275-004.002	BJ					
97698	16.3-16.7	native	99A8275-005.002	BJ					
97698	18.2-18.8	native	99A8275-008.002	BJ					
97698	4.6-5.8	native	99A8275-001.002	BJ					
97698	8.2-8.6	native	99A8275-002.002	BJ					
95998	24.6-25.0	bedrock	99A7799-006.002	E					
95998	5.0-5.6	native	99A7799-001.002	E					
97698	11.2-11.6	native	99A8275-003.002	E					



Appendix E  
Real VOC Data

Borehole	Sample Interval	Material	RIN/Event/Bottle	lab_result_qualifier_codes	1,1,1,2-TETRACHLOROETHANE (ug/kg)	1,1,1-TRICHLOROETHANE (ug/kg)	1,1,2,2-TETRACHLOROETHANE (ug/kg)	1,1,2-TRICHLOROETHANE (ug/kg)	1,1,2-Trichlorotrifluoroethane (ug/kg)
97698	13.5-13.9	native	99A8275-004.002	E					
97698	16.3-16.7	native	99A8275-005.002	E					
97698	18.2-18.8	native	99A8275-008.002	E					
90998	3.8-4.0	native	98A2015-001.010	J					
95998	12.4-12.8	native	99A7799-003.002	J					
95998	17.7-18.2	native	99A7799-005.002	J					
95998	24.6-25.0	bedrock	99A7799-006.002	J					
95998	5.0-5.6	native	99A7799-001.002	J					
96198	4.4-4.7	native	99A3210-003.013	J					
96398	12.4-12.7	native	99A4102-001.009	J					
96398	16.2-16.4	bedrock	99A4102-001.012	J					
96398	4.3-4.8	native	99A4102-001.003	J					
96398	8.4-8.9	native	99A4102-001.006	J					
96498	4.8-5.2	native	99A3210-001.013	J					
96598	11.6-12.0	native	99A6817-003.002	J					
96598	22.3-22.7	bedrock	99A6817-006.002	J					
96598	8.4-8.8	native	99A6817-002.002	J					
96698	12.4-12.8	native	99A6649-003.002	J					
96698	17.7-18.3	native	99A7930-001.002	J					
96698	20.2-20.6	native	99A7930-002.002	J					
96698	22.4-22.8	bedrock	99A7930-003.002	J					
96798	12.5-12.9	native	99A6650-003.002	J					
96798	16.0-16.4	native	99A6650-004.002	J					
96798	20.4-20.8	native	99A6650-005.002	J					
96798	8.4-8.8	native	99A6650-002.002	J					
96898	17.1-17.4	bedrock	99A6307-004.002	J					
96998	4.4-4.8	native	99A6824-001.002	J					
96998	8.4-8.8	native	99A6824-002.002	J					
97098	4.2-4.7	native	99A6308-001.003	J					
97098	8.4-8.8	native	99A6308-002.003	J					
97198	12.4-12.8	native	99A4102-002.009	J					
97198	15.5-16.1	native	99A4102-002.012	J					
97198	4.4-4.8	native	99A4102-002.006	J					
97198	7.3-7.6	native	99A4102-002.003	J					
97298	12.4-12.8	native	99A6825-003.002	J					
97298	4.0-4.4	native	99A6825-001.002	J					
97298	8.4-8.8	native	99A6825-002.002	J					
97698	11.2-11.6	native	99A8275-003.002	J					
97698	13.5-13.9	native	99A8275-004.002	J					
97698	16.3-16.7	native	99A8275-005.002	J					
97698	18.2-18.8	native	99A8275-008.002	J					
97698	19.4-19.8	native	99A8275-009.002	J					
97698	8.2-8.6	native	99A8275-002.002	J					

Appendix E  
Real VOC Data

Borehole	Sample Interval	Material	RIN/Event/Bottle	lab_result_qualifier_codes	1,1,1,2-TETRACHLOROETHANE (ug/kg)	1,1,1-TRICHLOROETHANE (ug/kg)	1,1,2,2-TETRACHLOROETHANE (ug/kg)	1,1,2-TRICHLOROETHANE (ug/kg)	1,1,2-Trichlorotrifluoroethane (ug/kg)
91198	11.6-11.9	native	98A1091-001.035	JB					
91198	15.5-15.8	native	98A1091-001.036	JB					
91198	3.1-3.4	native	98A1091-001.033	JB					
91198	7.7-8.0	native	98A1091-001.034	JB					
92598	12.0-12.5	native	98A1092-001.035	JB					160
92598	16.0-16.75	bedrock	98A1092-001.036	JB					230
96598	22.3-22.7	bedrock	99A6817-006.002	JB					
96698	12.4-12.8	native	99A6649-003.002	JB					
96698	4.2-4.6	native	99A6649-001.002	JB					
96698	8.2-8.6	native	99A6649-002.002	JB					
96798	12.5-12.9	native	99A6650-003.002	JB					
96798	16.0-16.4	native	99A6650-004.002	JB					
96798	20.4-20.8	native	99A6650-005.002	JB					
96798	4.4-4.8	native	99A6650-001.002	JB					
96798	8.4-8.8	native	99A6650-002.002	JB					
96898	12.3-12.6	native	99A6307-003.002	JB					
96898	17.1-17.4	bedrock	99A6307-004.002	JB					
96898	4.4-4.7	native	99A6307-001.002	JB					
96898	8.4-8.7	native	99A6307-002.002	JB					
96998	12.4-12.7	native	99A6824-003.002	JB					
96998	17.2-17.8	bedrock	99A6824-004.002	JB					
96998	4.4-4.8	native	99A6824-001.002	JB					
96998	8.4-8.8	native	99A6824-002.002	JB					
97098	16.5-17.0	bedrock	99A6308-004.003	JB					
97298	16.4-17.0	native	99A6825-004.002	JB					
97298	17.7-18.2	bedrock	99A6825-005.002	JB					
97698	19.4-19.8	native	99A8275-009.002	JB					
90998	3.8-4.0	native	98A2015-001.010	U	790	790	790	790	790
91198	11.6-11.9	native	98A1091-001.035	U	690	690	690	690	690
91198	15.5-15.8	native	98A1091-001.036	U	680	680	680	680	680
91198	19.1-19.5	native	98A1091-001.037	U	630	630	630	630	630
91198	19.5-19.8	bedrock	98A1091-001.038	U	620	620	620	620	620
91198	3.1-3.4	native	98A1091-001.033	U	710	710	710	710	710
91198	7.7-8.0	native	98A1091-001.034	U	680	680	680	680	680
92598	12.0-12.5	native	98A1092-001.035	U	700	700	700	700	
92598	16.0-16.75	bedrock	98A1092-001.036	U	720	720	720	720	
92598	3.5-4.0	native	98A1092-001.033	U	650	650	650	650	650
92598	7.5-8.0	native	98A1092-001.034	U	610	610	610	610	610
95998	12.4-12.8	native	99A7799-003.002	U	58	58	58	58	58
95998	14.8-15.2	native	99A7799-004.002	U	53	53	53	53	53
95998	17.7-18.2	native	99A7799-005.002	U	56	56	56	56	56
95998	24.6-25.0	bedrock	99A7799-006.002	U	63	63	63	63	63
95998	5.0-5.6	native	99A7799-001.002	U	56	56	56	56	56

Appendix E  
Real VOC Data

Borehole	Sample Interval	Material	RIN/Event/Bottle	lab_result_qualifier_codes	1,1,1,2-TETRACHLOROETHANE (ug/kg)	1,1,1-TRICHLOROETHANE (ug/kg)	1,1,1,2,2-TETRACHLOROETHANE (ug/kg)	1,1,2-TRICHLOROETHANE (ug/kg)	1,1,2-Trichlorotrifluoroethane (ug/kg)
95998	8.4-8.8	native	99A7799-002.002	U	5.2	5.2	5.2	5.2	
96098	12.5-13.0	native	99A3210-002.015	U	700	700	700	700	
96098	16.0-16.2	bedrock	99A3210-002.016	U	700	700	700	700	
96098	4.5-4.8	native	99A3210-002.013	U	730	730	730	730	
96098	8.5-8.8	native	99A3210-002.014	U	690	690	690	690	
96198	12.0-12.5	native	99A3210-003.015	U	760	760	760	760	
96198	15.8-16.2	bedrock	99A3210-003.016	U	700	700	700	700	
96198	4.4-4.7	native	99A3210-003.013	U	700	700	700	700	
96198	8.1-8.5	native	99A3210-003.014	U	670	670	670	670	
96298	12.25-12.75	native	99A3210-004.016	U	750	750	750	750	
96298	16.1-16.5	bedrock	99A3210-004.017	U	720	720	720	720	
96298	4.3-4.7	native	99A3210-004.013	U	700	700	700	700	
96298	8.0-9.0	native	99A3210-004.014	U	670	670	670	670	
96398	12.4-12.7	native	99A4102-001.009	U	710	710	710	710	
96398	16.2-16.4	bedrock	99A4102-001.012	U	730	730	730	730	
96398	4.3-4.8	native	99A4102-001.003	U	700	700	700	700	
96398	8.4-8.9	native	99A4102-001.006	U	710	710	710	710	
96498	13-13.5	native	99A3210-001.015	U		1300	1300	1300	
96498	16.0-16.5	native	99A3210-001.016	U		1300	1300	1300	
96498	18.0-18.6	native	99A3210-001.017	U		1300	1300	1300	
96498	22.0-22.5	bedrock	99A3210-001.018	U		1500	1500	1500	
96498	4.8-5.2	native	99A3210-001.013	U		1500	1500	1500	
96498	9.5-10.0	native	99A3210-001.014	U		1300	1300	1300	
96598	11.6-12.0	native	99A6817-003.002	U	5.4	5.4	5.4	5.4	
96598	15.2-15.6	native	99A6817-004.002	U	6	6	6	6	
96598	18.6-18.9	native	99A6817-005.002	U	5.3	5.3	5.3	5.3	
96598	22.3-22.7	bedrock	99A6817-006.002	U	6.2	6.2	6.2	6.2	
96598	4.2-4.6	native	99A6817-001.002	U	5.7	5.7	5.7	5.7	
96598	8.4-8.8	native	99A6817-002.002	U	5.3	5.3	5.3	5.3	
96698	12.4-12.8	native	99A6649-003.002	U	5.9	5.9	5.9	5.9	
96698	17.7-18.3	native	99A7930-001.002	U	5.6	5.6	5.6	5.6	
96698	20.2-20.6	native	99A7930-002.002	U	5.4	5.4	5.4	5.4	
96698	22.4-22.8	bedrock	99A7930-003.002	U	6.4	6.4	6.4	6.4	
96698	4.2-4.6	native	99A6649-001.002	U	5.7	5.7	5.7	5.7	
96698	8.2-8.6	native	99A6649-002.002	U	5.6	5.6	5.6	5.6	
96798	12.5-12.9	native	99A6650-003.002	U	6.2	6.2	6.2	6.2	
96798	16.0-16.4	native	99A6650-004.002	U	7.2	7.2	7.2	7.2	
96798	20.4-20.8	native	99A6650-005.002	U	7.4	7.4	7.4	7.4	
96798	4.4-4.8	native	99A6650-001.002	U	5.3	5.3	5.3	5.3	
96798	8.4-8.8	native	99A6650-002.002	U	6.3	6.3	6.3	6.3	
96898	12.3-12.6	native	99A6307-003.002	U	6.4	6.4	6.4	6.4	
96898	17.1-17.4	bedrock	99A6307-004.002	U	5.3	5.3	5.3	5.3	
96898	4.4-4.7	native	99A6307-001.002	U	5.2	5.2	5.2	5.2	

Appendix E  
Real VOC Data

Borehole	Sample Interval	Material	RIN/Event/Bottle	lab_result_qualifier_codes	1,1,1,2-TETRACHLOROETHANE (ug/kg)	1,1,1-TRICHLOROETHANE (ug/kg)	1,1,2,2-TETRACHLOROETHANE (ug/kg)	1,1,2-TRICHLOROETHANE (ug/kg)	1,1,2-Trichlorotrifluoroethane (ug/kg)
96988	8.4-8.7	native	99A6307-002.002	U	5.2	5.2	5.2	5.2	
96998	12.4-12.7	native	99A6824-003.002	U	5.6	5.6	5.6	5.6	
96998	17.2-17.8	bedrock	99A6824-004.002	U	5.7	5.7	5.7	5.7	
96998	4.4-4.8	native	99A6824-001.002	U	5.3	5.3	5.3	5.3	
96998	8.4-8.8	native	99A6824-002.002	U	5.2	5.2	5.2	5.2	
97098	12.4-12.6	native	99A6308-003.003	U	5.1	5.1	5.1	5.1	
97098	16.5-17.0	bedrock	99A6308-004.003	U	5.7	5.7	5.7	5.7	
97098	4.2-4.7	native	99A6308-001.003	U	5.5	5.5	5.5	5.5	
97098	8.4-8.8	native	99A6308-002.003	U	5.8	5.8	5.8	5.8	
97198	12.4-12.8	native	99A4102-002.009	U	650	650	650	650	
97198	15.5-16.1	native	99A4102-002.012	U	740	740	740	740	
97198	20.4-20.8	native	99A4102-002.015	U	670	670	670	670	
97198	24.4-24.8	bedrock	99A4102-002.018	U	700	700	700	700	
97198	4.4-4.8	native	99A4102-002.006	U	700	700	700	700	
97198	7.3-7.6	native	99A4102-002.003	U	650	650	650	650	
97298	12.4-12.8	native	99A6825-003.002	U	5.3	5.3	5.3	5.3	
97298	16.4-17.0	native	99A6825-004.002	U	5.4	5.4	5.4	5.4	
97298	17.7-18.2	bedrock	99A6825-005.002	U	6.1	6.1	6.1	6.1	
97298	4.0-4.4	native	99A6825-001.002	U	5.4	5.4	5.4	5.4	
97298	8.4-8.8	native	99A6825-002.002	U	5.7	5.7	5.7	5.7	
97698	11.2-11.6	native	99A8275-003.002	U	5.2	5.2	5.2	5.2	
97698	13.5-13.9	native	99A8275-004.002	U	5.4	5.4	5.4	5.4	
97698	16.3-16.7	native	99A8275-005.002	U	5.3	5.3	5.3	5.3	
97698	18.2-18.8	native	99A8275-008.002	U	5.6	5.6	5.6	5.6	
97698	19.4-19.8	native	99A8275-009.002	U	5.7	5.7	5.7	5.7	
97698	4.6-5.8	native	99A8275-001.002	U	5.3	5.3	5.3	5.3	
97698	8.2-8.6	native	99A8275-002.002	U	5.3	5.3	5.3	5.3	

Appendix E  
Real VOC Data

Borehole	Sample Interval	Material	RIN/Event/Bottle	lab_result_qualifier_codes	1,1-DICHLOROETHANE (ug/kg)	1,1-DICHLOROETHENE (ug/kg)	1,1-DICHLOROPROPENE (ug/kg)	1,2,3-TRICHLOROBENZENE (ug/kg)	1,2,3-TRICHLOROPROPANE (ug/kg)
90998	3.8-4.0	native	98A2015-001.010						
91198	11.6-11.9	native	98A1091-001.035						
91198	15.5-15.8	native	98A1091-001.036						
91198	19.1-19.5	native	98A1091-001.037						
91198	19.5-19.8	bedrock	98A1091-001.038						
91198	3.1-3.4	native	98A1091-001.033						
91198	7.7-8.0	native	98A1091-001.034						
92598	12.0-12.5	native	98A1092-001.035						
92598	16.0-16.75	bedrock	98A1092-001.036						
92598	3.5-4.0	native	98A1092-001.033						
92598	7.5-8.0	native	98A1092-001.034						
95998	12.4-12.8	native	99A7799-003.002						
95998	14.8-15.2	native	99A7799-004.002						
95998	17.7-18.2	native	99A7799-005.002						
95998	24.6-25.0	bedrock	99A7799-006.002						
95998	5.0-5.6	native	99A7799-001.002						
95998	8.4-8.8	native	99A7799-002.002						
96298	16.1-16.5	bedrock	99A3210-004.017						
96498	13-13.5	native	99A3210-001.015						
96498	16.0-16.5	native	99A3210-001.016						
96498	18.0-18.6	native	99A3210-001.017						
96498	22.0-22.5	bedrock	99A3210-001.018						
96498	4.8-5.2	native	99A3210-001.013						
96498	9.5-10.0	native	99A3210-001.014						
96598	11.6-12.0	native	99A6817-003.002						
96598	15.2-15.6	native	99A6817-004.002						
96598	18.6-18.9	native	99A6817-005.002						
96598	22.3-22.7	bedrock	99A6817-006.002						
96598	4.2-4.6	native	99A6817-001.002						
96598	8.4-8.8	native	99A6817-002.002						
96698	12.4-12.8	native	99A6649-003.002						
96698	17.7-18.3	native	99A7930-001.002						
96698	20.2-20.6	native	99A7930-002.002						
96698	22.4-22.8	bedrock	99A7930-003.002						
96698	4.2-4.6	native	99A6649-001.002						
96698	8.2-8.6	native	99A6649-002.002						
96798	12.5-12.9	native	99A6650-003.002						
96798	16.0-16.4	native	99A6650-004.002						
96798	20.4-20.8	native	99A6650-005.002						
96798	8.4-8.8	native	99A6650-002.002						
96898	12.3-12.6	native	99A6307-003.002						
96898	17.1-17.4	bedrock	99A6307-004.002						
96898	4.4-4.7	native	99A6307-001.002						

Appendix E  
Real VOC Data

Borehole	Sample Interval	Material	RIN/E vent/Bottle	lab_result_qualifier_codes	1,1-DICHLOROETHANE (ug/kg)	1,1-DICHLOROETHENE (ug/kg)	1,1-DICHLOROPROPENE (ug/kg)	1,2,3-TRICHLOROBENZENE (ug/kg)	1,2,3-TRICHLOROPROPANE (ug/kg)
96898	8.4-8.7	native	99A6307-002.002						
96998	4.4-4.8	native	99A6824-001.002						
96998	8.4-8.8	native	99A6824-002.002						
97198	20.4-20.8	native	99A4102-002.015						
97198	24.4-24.8	bedrock	99A4102-002.018						
97298	12.4-12.8	native	99A6825-003.002						
97298	16.4-17.0	native	99A6825-004.002						
97298	17.7-18.2	bedrock	99A6825-005.002						
97298	4.0-4.4	native	99A6825-001.002						
97298	8.4-8.8	native	99A6825-002.002						
97698	11.2-11.6	native	99A8275-003.002						
97698	13.5-13.9	native	99A8275-004.002						
97698	16.3-16.7	native	99A8275-005.002						
97698	18.2-18.8	native	99A8275-008.002						
97698	19.4-19.8	native	99A8275-009.002						
97698	4.6-5.8	native	99A8275-001.002						
97698	8.2-8.6	native	99A8275-002.002						
90998	3.8-4.0	native	98A2015-001.010	B					
91198	11.6-11.9	native	98A1091-001.035	B					
91198	15.5-15.8	native	98A1091-001.036	B					
91198	19.1-19.5	native	98A1091-001.037	B					
91198	19.5-19.8	bedrock	98A1091-001.038	B					
91198	7.7-8.0	native	98A1091-001.034	B					
92598	12.0-12.5	native	98A1092-001.035	B					
92598	16.0-16.75	bedrock	98A1092-001.036	B					
92598	3.5-4.0	native	98A1092-001.033	B					
92598	7.5-8.0	native	98A1092-001.034	B					
97698	11.2-11.6	native	99A8275-003.002	B					
97698	13.5-13.9	native	99A8275-004.002	B					
97698	16.3-16.7	native	99A8275-005.002	B					
97698	18.2-18.8	native	99A8275-008.002	B					
95998	24.6-25.0	bedrock	99A7799-008.002	BJ					
96598	15.2-15.6	native	99A6817-004.002	BJ					
97198	24.4-24.8	bedrock	99A4102-002.018	BJ					
97698	11.2-11.6	native	99A8275-003.002	BJ					
97698	13.5-13.9	native	99A8275-004.002	BJ					
97698	16.3-16.7	native	99A8275-005.002	BJ					
97698	18.2-18.8	native	99A8275-008.002	BJ					
97698	4.6-5.8	native	99A8275-001.002	BJ					
97698	8.2-8.6	native	99A8275-002.002	BJ					
95998	24.6-25.0	bedrock	99A7799-006.002	E					
95998	5.0-5.6	native	99A7799-001.002	E					
97698	11.2-11.6	native	99A8275-003.002	E					

Appendix E  
Real VOC Data

Borehole	Sample Interval	Material	RIN/Event/Bottle	lab_result_qualifier_codes	1,1-DICHLOROETHANE (ug/kg)	1,1-DICHLOROETHENE (ug/kg)	1,1-DICHLOROPROPENE (ug/kg)	1,2,3-TRICHLOROBENZENE (ug/kg)	1,2,3-TRICHLOROPROPANE (ug/kg)
97698	13.5-13.9	native	99A8275-004.002	E					
97698	16.3-16.7	native	99A8275-005.002	E					
97698	18.2-18.8	native	99A8275-008.002	E					
90998	3.8-4.0	native	98A2015-001.010	J					
95998	12.4-12.8	native	99A7799-003.002	J					
95998	17.7-18.2	native	99A7799-005.002	J					
95998	24.6-25.0	bedrock	99A7799-006.002	J				1.8	
95998	5.0-5.6	native	99A7799-001.002	J				2	
96198	4.4-4.7	native	99A3210-003.013	J					
96398	12.4-12.7	native	99A4102-001.009	J					
96398	16.2-16.4	bedrock	99A4102-001.012	J					
96398	4.3-4.8	native	99A4102-001.003	J					
96398	8.4-8.9	native	99A4102-001.006	J					
96498	4.8-5.2	native	99A3210-001.013	J					
96598	11.6-12.0	native	99A6817-003.002	J					
96598	22.3-22.7	bedrock	99A6817-006.002	J					
96598	8.4-8.8	native	99A6817-002.002	J				1.5	
96698	12.4-12.8	native	99A6649-003.002	J					
96698	17.7-18.3	native	99A7930-001.002	J					
96698	20.2-20.6	native	99A7930-002.002	J					
96698	22.4-22.8	bedrock	99A7930-003.002	J					
96798	12.5-12.9	native	99A6650-003.002	J					
96798	16.0-16.4	native	99A6650-004.002	J					
96798	20.4-20.8	native	99A6650-005.002	J					
96798	8.4-8.8	native	99A6650-002.002	J					
96898	17.1-17.4	bedrock	99A6307-004.002	J					
96998	4.4-4.8	native	99A6824-001.002	J					
96998	8.4-8.8	native	99A6824-002.002	J					
97098	4.2-4.7	native	99A6308-001.003	J					
97098	8.4-8.8	native	99A6308-002.003	J					
97198	12.4-12.8	native	99A4102-002.009	J					
97198	15.5-16.1	native	99A4102-002.012	J					
97198	4.4-4.8	native	99A4102-002.006	J					
97198	7.3-7.6	native	99A4102-002.003	J					
97298	12.4-12.8	native	99A6825-003.002	J					
97298	4.0-4.4	native	99A6825-001.002	J					
97298	8.4-8.8	native	99A6825-002.002	J					
97698	11.2-11.6	native	99A8275-003.002	J					
97698	13.5-13.9	native	99A8275-004.002	J					
97698	16.3-16.7	native	99A8275-005.002	J					
97698	18.2-18.8	native	99A8275-008.002	J					
97698	19.4-19.8	native	99A8275-009.002	J					
97698	8.2-8.6	native	99A8275-002.002	J					

325



Appendix E  
Real VOC Data

Borehole	Sample Interval	Material	RIN/Event/Bottle	lab_result_qualifier_codes	1,1-DICHLOROETHANE (ug/kg)	1,1-DICHLOROETHENE (ug/kg)	1,1-DICHLOROPROPENE (ug/kg)	1,2,3-TRICHLOROBENZENE (ug/kg)	1,2,3-TRICHLOROPROPANE (ug/kg)
91198	11.6-11.9	native	98A1091-001.035	JB					
91198	15.5-15.8	native	98A1091-001.036	JB					
91198	3.1-3.4	native	98A1091-001.033	JB					
91198	7.7-8.0	native	98A1091-001.034	JB					
92598	12.0-12.5	native	98A1092-001.035	JB					
92598	16.0-16.75	bedrock	98A1092-001.036	JB					
96598	22.3-22.7	bedrock	99A6817-006.002	JB					
96698	12.4-12.8	native	99A6649-003.002	JB					
96698	4.2-4.6	native	99A6649-001.002	JB					
96698	8.2-8.6	native	99A6649-002.002	JB					
96798	12.5-12.9	native	99A6650-003.002	JB					
96798	16.0-16.4	native	99A6650-004.002	JB					
96798	20.4-20.8	native	99A6650-005.002	JB					
96798	4.4-4.8	native	99A6650-001.002	JB					
96798	8.4-8.8	native	99A6650-002.002	JB					
96898	12.3-12.6	native	99A6307-003.002	JB					
96898	17.1-17.4	bedrock	99A6307-004.002	JB					
96898	4.4-4.7	native	99A6307-001.002	JB					
96898	8.4-8.7	native	99A6307-002.002	JB					
96998	12.4-12.7	native	99A6824-003.002	JB					
96998	17.2-17.8	bedrock	99A6824-004.002	JB					
96998	4.4-4.8	native	99A6824-001.002	JB					
96998	8.4-8.8	native	99A6824-002.002	JB					
97098	16.5-17.0	bedrock	99A6308-004.003	JB					
97298	16.4-17.0	native	99A6825-004.002	JB					
97298	17.7-18.2	bedrock	99A6825-005.002	JB					
97698	19.4-19.8	native	99A8275-009.002	JB					
90998	3.8-4.0	native	98A2015-001.010	U	790	790	790	790	790
91198	11.6-11.9	native	98A1091-001.035	U	690	690	690	690	690
91198	15.5-15.8	native	98A1091-001.036	U	680	680	680	680	680
91198	19.1-19.5	native	98A1091-001.037	U	630	630	630	630	630
91198	19.5-19.8	bedrock	98A1091-001.038	U	620	620	620	620	620
91198	3.1-3.4	native	98A1091-001.033	U	710	710	710	710	710
91198	7.7-8.0	native	98A1091-001.034	U	680	680	680	680	680
92598	12.0-12.5	native	98A1092-001.035	U	700	700	700	700	700
92598	16.0-16.75	bedrock	98A1092-001.036	U	720	720	720	720	720
92598	3.5-4.0	native	98A1092-001.033	U	650	650	650	650	650
92598	7.5-8.0	native	98A1092-001.034	U	610	610	610	610	610
95998	12.4-12.8	native	99A7799-003.002	U	5.8	5.8	5.8	5.8	5.8
95998	14.8-15.2	native	99A7799-004.002	U	5.3	5.3	5.3	5.3	5.3
95998	17.7-18.2	native	99A7799-005.002	U	5.6	5.6	5.6	5.6	5.6
95998	24.6-25.0	bedrock	99A7799-006.002	U	6.3	6.3	6.3	6.3	6.3
95998	5.0-5.6	native	99A7799-001.002	U	5.6	5.6	5.6	5.6	5.6



Appendix E  
Real VOC Data

Borehole	Sample Interval	Material	RIN/Event/Bottle	lab_result_qualifier_codes	1,1-DICHLOROETHANE (ug/kg)	1,1-DICHLOROETHENE (ug/kg)	1,1-DICHLOROPROPENE (ug/kg)	1,2,3-TRICHLOROBENZENE (ug/kg)	1,2,3-TRICHLOROPROPANE (ug/kg)
96098	8.4-8.8	native	99A7799-002.002	U	5.2	5.2	5.2	5.2	5.2
96098	12.5-13.0	native	99A3210-002.015	U	700	700	700	700	700
96098	16.0-16.2	bedrock	99A3210-002.016	U	700	700	700	700	700
96098	4.5-4.8	native	99A3210-002.013	U	730	730	730	730	730
96098	8.5-8.8	native	99A3210-002.014	U	690	690	690	690	690
96198	12.0-12.5	native	99A3210-003.015	U	760	760	760	760	760
96198	15.8-16.2	bedrock	99A3210-003.016	U	700	700	700	700	700
96198	4.4-4.7	native	99A3210-003.013	U	700	700	700	700	700
96198	8.1-8.5	native	99A3210-003.014	U	670	670	670	670	670
96298	12.25-12.75	native	99A3210-004.016	U	750	750	750	750	750
96298	16.1-16.5	bedrock	99A3210-004.017	U	720	720	720	720	720
96298	4.3-4.7	native	99A3210-004.013	U	700	700	700	700	700
96298	8.0-9.0	native	99A3210-004.014	U	670	670	670	670	670
96398	12.4-12.7	native	99A4102-001.009	U	710	710	710	710	710
96398	16.2-16.4	bedrock	99A4102-001.012	U	730	730	730	730	730
96398	4.3-4.8	native	99A4102-001.003	U	700	700	700	700	700
96398	8.4-8.9	native	99A4102-001.006	U	710	710	710	710	710
96498	13-13.5	native	99A3210-001.015	U	1300	1300			
96498	16.0-16.5	native	99A3210-001.016	U	1300	1300			
96498	18.0-18.6	native	99A3210-001.017	U	1300	1300			
96498	22.0-22.5	bedrock	99A3210-001.018	U	1500	1500			
96498	4.8-5.2	native	99A3210-001.013	U	1500	1500			
96498	9.5-10.0	native	99A3210-001.014	U	1300	1300			
96598	11.6-12.0	native	99A6817-003.002	U	5.4	5.4	5.4	5.4	5.4
96598	15.2-15.6	native	99A6817-004.002	U	6	6	6	6	6
96598	18.6-18.9	native	99A6817-005.002	U	5.3	5.3	5.3	5.3	5.3
96598	22.3-22.7	bedrock	99A6817-006.002	U	6.2	6.2	6.2	6.2	6.2
96598	4.2-4.6	native	99A6817-001.002	U	5.7	5.7	5.7	5.7	5.7
96598	8.4-8.8	native	99A6817-002.002	U	5.3	5.3	5.3	5.3	5.3
96698	12.4-12.8	native	99A6649-003.002	U	5.9	5.9	5.9	5.9	5.9
96698	17.7-18.3	native	99A7930-001.002	U	5.6	5.6	5.6	5.6	5.6
96698	20.2-20.6	native	99A7930-002.002	U	5.4	5.4	5.4	5.4	5.4
96698	22.4-22.8	bedrock	99A7930-003.002	U	6.4	6.4	6.4	6.4	6.4
96698	4.2-4.6	native	99A6649-001.002	U	5.7	5.7	5.7	5.7	5.7
96698	8.2-8.6	native	99A6649-002.002	U	5.6	5.6	5.6	5.6	5.6
96798	12.5-12.9	native	99A6650-003.002	U	6.2	6.2	6.2	6.2	6.2
96798	16.0-16.4	native	99A6650-004.002	U	7.2	7.2	7.2	7.2	7.2
96798	20.4-20.8	native	99A6650-005.002	U	7.4	7.4	7.4	7.4	7.4
96798	4.4-4.8	native	99A6650-001.002	U	5.3	5.3	5.3	5.3	5.3
96798	8.4-8.8	native	99A6650-002.002	U	6.3	6.3	6.3	6.3	6.3
96898	12.3-12.6	native	99A6307-003.002	U	6.4	6.4	6.4	6.4	6.4
96898	17.1-17.4	bedrock	99A6307-004.002	U	5.3	5.3	5.3	5.3	5.3
96898	4.4-4.7	native	99A6307-001.002	U	5.2	5.2	5.2	5.2	5.2

Appendix E  
Real VOC Data

Borehole	Sample Interval	Material	RIN/Event/Bottle	lab_result_qualifier_codes	1,1-DICHLOROETHANE (ug/kg)	1,1-DICHLOROETHENE (ug/kg)	1,1-DICHLOROPROPENE (ug/kg)	1,2,3-TRICHLOROBENZENE (ug/kg)	1,2,3-TRICHLOROPROPANE (ug/kg)
96898	8.4-8.7	native	99A6307-002.002	U	5.2	5.2	5.2	5.2	5.2
96998	12.4-12.7	native	99A6824-003.002	U	5.6	5.6	5.6	5.6	5.6
96998	17.2-17.8	bedrock	99A6824-004.002	U	5.7	5.7	5.7	5.7	5.7
96998	4.4-4.8	native	99A6824-001.002	U	5.3	5.3	5.3	5.3	5.3
96998	8.4-8.8	native	99A6824-002.002	U	5.2	5.2	5.2	5.2	5.2
97098	12.4-12.6	native	99A6308-003.003	U	5.1	5.1	5.1	5.1	5.1
97098	16.5-17.0	bedrock	99A6308-004.003	U	5.7	5.7	5.7	5.7	5.7
97098	4.2-4.7	native	99A6308-001.003	U	5.5	5.5	5.5	5.5	5.5
97098	8.4-8.8	native	99A6308-002.003	U	5.8	5.8	5.8	5.8	5.8
97198	12.4-12.8	native	99A4102-002.009	U	650	650	650	650	650
97198	15.5-16.1	native	99A4102-002.012	U	740	740	740	740	740
97198	20.4-20.8	native	99A4102-002.015	U	670	670	670	670	670
97198	24.4-24.8	bedrock	99A4102-002.018	U	700	700	700	700	700
97198	4.4-4.8	native	99A4102-002.006	U	700	700	700	700	700
97198	7.3-7.6	native	99A4102-002.003	U	650	650	650	650	650
97298	12.4-12.8	native	99A6825-003.002	U	5.3	5.3	5.3	5.3	5.3
97298	16.4-17.0	native	99A6825-004.002	U	5.4	5.4	5.4	5.4	5.4
97298	17.7-18.2	bedrock	99A6825-005.002	U	6.1	6.1	6.1	6.1	6.1
97298	4.0-4.4	native	99A6825-001.002	U	5.4	5.4	5.4	5.4	5.4
97298	8.4-8.8	native	99A6825-002.002	U	5.7	5.7	5.7	5.7	5.7
97698	11.2-11.6	native	99A8275-003.002	U	5.2	5.2	5.2	5.2	5.2
97698	13.5-13.9	native	99A8275-004.002	U	5.4	5.4	5.4	5.4	5.4
97698	16.3-16.7	native	99A8275-005.002	U	5.3	5.3	5.3	5.3	5.3
97698	18.2-18.8	native	99A8275-008.002	U	5.6	5.6	5.6	5.6	5.6
97698	19.4-19.8	native	99A8275-009.002	U	5.7	5.7	5.7	5.7	5.7
97698	4.6-5.8	native	99A8275-001.002	U	5.3	5.3	5.3	5.3	5.3
97698	8.2-8.6	native	99A8275-002.002	U	5.3	5.3	5.3	5.3	5.3

Appendix E  
Real VOC Data

Borehole	Sample Interval	Material	RIN/Event/Bottle	lab_result_qualifier_codes	1,2,4-TRICHLORO BENZENE (ug/kg)	1,2,4-TRIMETHYLBENZENE (ug/kg)	1,2-CIS-DICHLOROETHYLENE (ug/kg)	1,2-DIBROMO-3-CHLOROPROPANE (ug/kg)	1,2-DIBROMOETHANE (ug/kg)	1,2-Dichlorobenzene (ug/kg)
90998	3.8-4.0	native	98A2015-001.010							
91198	11.6-11.9	native	98A1091-001.035							
91198	15.5-15.8	native	98A1091-001.036							
91198	19.1-19.5	native	98A1091-001.037							
91198	19.5-19.8	bedrock	98A1091-001.038							
91198	3.1-3.4	native	98A1091-001.033							
91198	7.7-8.0	native	98A1091-001.034							
92598	12.0-12.5	native	98A1092-001.035							
92598	16.0-16.75	bedrock	98A1092-001.036							
92598	3.5-4.0	native	98A1092-001.033							
92598	7.5-8.0	native	98A1092-001.034							
95998	12.4-12.8	native	99A7799-003.002							
95998	14.8-15.2	native	99A7799-004.002							
95998	17.7-18.2	native	99A7799-005.002							
95998	24.6-25.0	bedrock	99A7799-006.002				79.5			
95998	5.0-5.6	native	99A7799-001.002							
95998	8.4-8.8	native	99A7799-002.002							
96298	16.1-16.5	bedrock	99A3210-004.017							
96498	13-13.5	native	99A3210-001.015							
96498	16.0-16.5	native	99A3210-001.016							
96498	18.0-18.6	native	99A3210-001.017							
96498	22.0-22.5	bedrock	99A3210-001.018							
96498	4.8-5.2	native	99A3210-001.013							
96498	9.5-10.0	native	99A3210-001.014							
96598	11.6-12.0	native	99A6817-003.002							
96598	15.2-15.6	native	99A6817-004.002							
96598	18.6-18.9	native	99A6817-005.002							
96598	22.3-22.7	bedrock	99A6817-006.002							
96598	4.2-4.6	native	99A6817-001.002							
96598	8.4-8.8	native	99A6817-002.002							
96698	12.4-12.8	native	99A6649-003.002							
96698	17.7-18.3	native	99A7930-001.002							
96698	20.2-20.6	native	99A7930-002.002							
96698	22.4-22.8	bedrock	99A7930-003.002							
96698	4.2-4.6	native	99A6649-001.002							
96698	8.2-8.6	native	99A6649-002.002							
96798	12.5-12.9	native	99A6650-003.002							
96798	16.0-16.4	native	99A6650-004.002							
96798	20.4-20.8	native	99A6650-005.002				14.9			
96798	8.4-8.8	native	99A6650-002.002							
96898	12.3-12.6	native	99A6307-003.002							
96898	17.1-17.4	bedrock	99A6307-004.002							
96898	4.4-4.7	native	99A6307-001.002							

Appendix E  
Real VOC Data

Borehole	Sample Interval	Material	RIN/Event/Bottle	lab_result_qualifier_codes	1,2,4-TRICHLOROBENZENE (ug/kg)	1,2,4-TRIMETHYLBENZENE E (ug/kg)	1,2-CIS-DICHLOROETHYLENE (ug/kg)	1,2-DIBROMO-3-CHLOROPROPANE (ug/kg)	1,2-DIBROMOETHANE E (ug/kg)	1,2-Dichlorobenzene (ug/kg)
96898	8.4-8.7	native	99A6307-002.002							
96998	4.4-4.8	native	99A6824-001.002							
96998	8.4-8.8	native	99A6824-002.002							
97198	20.4-20.8	native	99A4102-002.015							
97198	24.4-24.8	bedrock	99A4102-002.018							
97298	12.4-12.8	native	99A6825-003.002							
97298	16.4-17.0	native	99A6825-004.002							
97298	17.7-18.2	bedrock	99A6825-005.002							
97298	4.0-4.4	native	99A6825-001.002							
97298	8.4-8.8	native	99A6825-002.002							
97698	11.2-11.6	native	99A8275-003.002				72.5			
97698	13.5-13.9	native	99A8275-004.002							
97698	16.3-16.7	native	99A8275-005.002							
97698	18.2-18.8	native	99A8275-008.002				21.9			
97698	19.4-19.8	native	99A8275-009.002				95.1			
97698	4.6-5.8	native	99A8275-001.002							
97698	8.2-8.6	native	99A8275-002.002							
90998	3.8-4.0	native	98A2015-001.010	B						
91198	11.6-11.9	native	98A1091-001.035	B						
91198	15.5-15.8	native	98A1091-001.036	B						
91198	19.1-19.5	native	98A1091-001.037	B						
91198	19.5-19.8	bedrock	98A1091-001.038	B						
91198	7.7-8.0	native	98A1091-001.034	B						
92598	12.0-12.5	native	98A1092-001.035	B						
92598	16.0-16.75	bedrock	98A1092-001.036	B						
92598	3.5-4.0	native	98A1092-001.033	B						
92598	7.5-8.0	native	98A1092-001.034	B						
97698	11.2-11.6	native	99A8275-003.002	B						
97698	13.5-13.9	native	99A8275-004.002	B						
97698	16.3-16.7	native	99A8275-005.002	B						
97698	18.2-18.8	native	99A8275-008.002	B						
95998	24.6-25.0	bedrock	99A7799-006.002	BJ						
96598	15.2-15.6	native	99A6817-004.002	BJ						
97198	24.4-24.8	bedrock	99A4102-002.018	BJ						
97698	11.2-11.6	native	99A8275-003.002	BJ						
97698	13.5-13.9	native	99A8275-004.002	BJ						
97698	16.3-16.7	native	99A8275-005.002	BJ						
97698	18.2-18.8	native	99A8275-008.002	BJ						
97698	4.6-5.8	native	99A8275-001.002	BJ						
97698	8.2-8.6	native	99A8275-002.002	BJ						
95998	24.6-25.0	bedrock	99A7799-006.002	E						
95998	5.0-5.6	native	99A7799-001.002	E						
97698	11.2-11.6	native	99A8275-003.002	E						

Appendix E  
Real VOC Data

Borehole	Sample Interval	Material	RIN/Event/Bottle	lab_result_qualifier_codes	1,2,4-TRICHLOROETHYLENE (ug/kg)	1,2,4-TRIMETHYLENE (ug/kg)	1,2-CIS-DICHLOROETHYLENE (ug/kg)	1,2-DIBROMO-3-CHLOROPROPANE (ug/kg)	1,2-DIBROMOETHANE (ug/kg)	1,2-Dichlorobenzene (ug/kg)
97698	13.5-13.9	native	99A8275-004.002	E						
97698	16.3-16.7	native	99A8275-005.002	E						
97698	18.2-18.8	native	99A8275-008.002	E						
90998	3.8-4.0	native	98A2015-001.010	J						
95998	12.4-12.8	native	99A7799-003.002	J						
95998	17.7-18.2	native	99A7799-005.002	J						
95998	24.6-25.0	bedrock	99A7799-006.002	J	1.8	0.63				
95998	5.0-5.6	native	99A7799-001.002	J	1.6		5.4			
96198	4.4-4.7	native	99A3210-003.013	J						
96398	12.4-12.7	native	99A4102-001.009	J						
96398	16.2-16.4	bedrock	99A4102-001.012	J						
96398	4.3-4.8	native	99A4102-001.003	J						
96398	8.4-8.9	native	99A4102-001.006	J						
96498	4.8-5.2	native	99A3210-001.013	J						
96598	11.6-12.0	native	99A6817-003.002	J						
96598	22.3-22.7	bedrock	99A6817-006.002	J						
96598	8.4-8.8	native	99A6817-002.002	J	1.4					
96698	12.4-12.8	native	99A6649-003.002	J						
96698	17.7-18.3	native	99A7930-001.002	J						
96698	20.2-20.6	native	99A7930-002.002	J						
96698	22.4-22.8	bedrock	99A7930-003.002	J						
96798	12.5-12.9	native	99A6650-003.002	J			1.1			
96798	16.0-16.4	native	99A6650-004.002	J			2			
96798	20.4-20.8	native	99A6650-005.002	J						
96798	8.4-8.8	native	99A6650-002.002	J						
96898	17.1-17.4	bedrock	99A6307-004.002	J						
96998	4.4-4.8	native	99A6824-001.002	J						
96998	8.4-8.8	native	99A6824-002.002	J						
97098	4.2-4.7	native	99A6308-001.003	J						
97098	8.4-8.8	native	99A6308-002.003	J						
97198	12.4-12.8	native	99A4102-002.009	J						
97198	15.5-16.1	native	99A4102-002.012	J						
97198	4.4-4.8	native	99A4102-002.006	J						
97198	7.3-7.6	native	99A4102-002.003	J						
97298	12.4-12.8	native	99A6825-003.002	J						
97298	4.0-4.4	native	99A6825-001.002	J						
97298	8.4-8.8	native	99A6825-002.002	J						
97698	11.2-11.6	native	99A8275-003.002	J			1.5			
97698	13.5-13.9	native	99A8275-004.002	J						
97698	16.3-16.7	native	99A8275-005.002	J			2.1			
97698	18.2-18.8	native	99A8275-008.002	J						
97698	19.4-19.8	native	99A8275-009.002	J						
97698	8.2-8.6	native	99A8275-002.002	J			1.1			

Appendix E  
Real VOC Data

Borehole	Sample Interval	Material	RIN/Event/Bottle	lab_result_qualifier_codes	1,2,4-TRICHLOROBENZENE (ug/kg)	1,2,4-TRIMETHYLBENZENE E (ug/kg)	1,2-CIS-DICHLOROETHYLENE (ug/kg)	1,2-DIBROMO-3-CHLOROPROPANE (ug/kg)	1,2-DIBROMOETHANE E (ug/kg)	1,2-Dichlorobenzene (ug/kg)
91198	11.6-11.9	native	98A1091-001.035	JB						
91198	15.5-15.8	native	98A1091-001.036	JB						
91198	3.1-3.4	native	98A1091-001.033	JB						
91198	7.7-8.0	native	98A1091-001.034	JB						
92598	12.0-12.5	native	98A1092-001.035	JB						
92598	16.0-16.75	bedrock	98A1092-001.036	JB						
96598	22.3-22.7	bedrock	99A6817-008.002	JB						
96698	12.4-12.8	native	99A6649-003.002	JB						
96698	4.2-4.6	native	99A6649-001.002	JB						
96698	8.2-8.6	native	99A6649-002.002	JB						
96798	12.5-12.9	native	99A6650-003.002	JB						
96798	16.0-16.4	native	99A6650-004.002	JB						
96798	20.4-20.8	native	99A6650-005.002	JB						
96798	4.4-4.8	native	99A6650-001.002	JB						
96798	8.4-8.8	native	99A6650-002.002	JB						
96898	12.3-12.6	native	99A6307-003.002	JB						
96898	17.1-17.4	bedrock	99A6307-004.002	JB						
96898	4.4-4.7	native	99A6307-001.002	JB						
96898	8.4-8.7	native	99A6307-002.002	JB						
96998	12.4-12.7	native	99A6824-003.002	JB						
96998	17.2-17.8	bedrock	99A6824-004.002	JB						
96998	4.4-4.8	native	99A6824-001.002	JB						
96998	8.4-8.8	native	99A6824-002.002	JB						
97098	16.5-17.0	bedrock	99A6308-004.003	JB						
97298	16.4-17.0	native	99A6825-004.002	JB						
97298	17.7-18.2	bedrock	99A6825-005.002	JB						
97698	19.4-19.8	native	99A8275-009.002	JB						
90998	3.8-4.0	native	98A2015-001.010	U	790	790		790	790	790
91198	11.6-11.9	native	98A1091-001.035	U	690	690		690	690	690
91198	15.5-15.8	native	98A1091-001.036	U	680	680		680	680	680
91198	19.1-19.5	native	98A1091-001.037	U	630	630		630	630	630
91198	19.5-19.8	bedrock	98A1091-001.038	U	620	620		620	620	620
91198	3.1-3.4	native	98A1091-001.033	U	710	710		710	710	710
91198	7.7-8.0	native	98A1091-001.034	U	680	680		680	680	680
92598	12.0-12.5	native	98A1092-001.035	U	700	700		700	700	700
92598	16.0-16.75	bedrock	98A1092-001.036	U	720	720		720	720	720
92598	3.5-4.0	native	98A1092-001.033	U	650	650		650	650	650
92598	7.5-8.0	native	98A1092-001.034	U	610	610		610	610	610
95998	12.4-12.8	native	99A7799-003.002	U	5.8	5.8	5.8	5.8	5.8	5.8
95998	14.8-15.2	native	99A7799-004.002	U	5.3	5.3	5.3	5.3	5.3	5.3
95998	17.7-18.2	native	99A7799-005.002	U	5.6	5.6	5.6	5.6	5.6	5.6
95998	24.6-25.0	bedrock	99A7799-006.002	U				6.3	6.3	6.3
95998	5.0-5.6	native	99A7799-001.002	U		5.6		5.6	5.6	5.6

Appendix E  
Real VOC Data

Borehole	Sample Interval	Material	RIN/Event/Bottle	lab_result_qualifier_codes	1,2,4-TRICHLOROBENZENE (ug/kg)	1,2,4-TRIMETHYLBENZENE E (ug/kg)	1,2-CIS-DICHLOROETHYLENE (ug/kg)	1,2-DIBROMO-3-CHLOROPROPANE (ug/kg)	1,2-DIBROMOETHAN E (ug/kg)	1,2-Dichlorobenzene (ug/kg)
95998 8.4-8.8	native	native	99A799-002.002	U	5.2	5.2	5.2	5.2	5.2	5.2
96098 12.5-13.0	native	native	99A3210-002.015	U	700	700		700	700	700
96098 16.0-16.2	bedrock	bedrock	99A3210-002.016	U	700	700		700	700	700
96098 4.5-4.8	native	native	99A3210-002.013	U	730	730		730	730	730
96098 8.5-8.8	native	native	99A3210-002.014	U	690	690		690	690	690
96198 12.0-12.5	native	native	99A3210-003.015	U	760	760		760	760	760
96198 15.8-16.2	bedrock	bedrock	99A3210-003.016	U	700	700		700	700	700
96198 4.4-4.7	native	native	99A3210-003.013	U	700	700		700	700	700
96198 8.1-8.5	native	native	99A3210-003.014	U	670	670		670	670	670
96298 12.25-12.75	native	native	99A3210-004.016	U	750	750		750	750	750
96298 16.1-16.5	bedrock	bedrock	99A3210-004.017	U	720	720		720	720	720
96298 4.3-4.7	native	native	99A3210-004.013	U	700	700		700	700	700
96298 8.0-9.0	native	native	99A3210-004.014	U	670	670		670	670	670
96398 12.4-12.7	native	native	99A4102-001.009	U	710	710		710	710	710
96398 16.2-16.4	bedrock	bedrock	99A4102-001.012	U	730	730		730	730	730
96398 4.3-4.8	native	native	99A4102-001.003	U	700	700		700	700	700
96398 8.4-8.9	native	native	99A4102-001.006	U	710	710		710	710	710
96498 13-13.5	native	native	99A3210-001.015	U						
96498 16.0-16.5	native	native	99A3210-001.016	U						
96498 18.0-18.6	native	native	99A3210-001.017	U						
96498 22.0-22.5	bedrock	bedrock	99A3210-001.018	U						
96498 4.8-5.2	native	native	99A3210-001.013	U						
96498 9.5-10.0	native	native	99A3210-001.014	U						
96598 11.6-12.0	native	native	99A6817-003.002	U	5.4	5.4	5.4	5.4	5.4	5.4
96598 15.2-15.6	native	native	99A6817-004.002	U	6	6	6	6	6	6
96598 18.6-18.9	native	native	99A6817-005.002	U	5.3	5.3	5.3	5.3	5.3	5.3
96598 22.3-22.7	bedrock	bedrock	99A6817-006.002	U	6.2	6.2	6.2	6.2	6.2	6.2
96598 4.2-4.6	native	native	99A6817-001.002	U	5.7	5.7	5.7	5.7	5.7	5.7
96598 8.4-8.8	native	native	99A6817-002.002	U		5.3	5.3	5.3	5.3	5.3
96698 12.4-12.8	native	native	99A6649-003.002	U	5.9	5.9	5.9	5.9	5.9	5.9
96698 17.7-18.3	native	native	99A7930-001.002	U	5.6	5.6	5.6	5.6	5.6	5.6
96698 20.2-20.6	native	native	99A7930-002.002	U	5.4	5.4	5.4	5.4	5.4	5.4
96698 22.4-22.8	bedrock	bedrock	99A7930-003.002	U	6.4	6.4	6.4	6.4	6.4	6.4
96698 4.2-4.6	native	native	99A6649-001.002	U	5.7	5.7	5.7	5.7	5.7	5.7
96698 8.2-8.6	native	native	99A6649-002.002	U	5.6	5.6	5.6	5.6	5.6	5.6
96798 12.5-12.9	native	native	99A6650-003.002	U	6.2	6.2		6.2	6.2	6.2
96798 16.0-16.4	native	native	99A6650-004.002	U	7.2	7.2		7.2	7.2	7.2
96798 20.4-20.8	native	native	99A6650-005.002	U	7.4	7.4		7.4	7.4	7.4
96798 4.4-4.8	native	native	99A6650-001.002	U	5.3	5.3	5.3	5.3	5.3	5.3
96798 8.4-8.8	native	native	99A6650-002.002	U	6.3	6.3	6.3	6.3	6.3	6.3
96898 12.3-12.6	native	native	99A6307-003.002	U	6.4	6.4	6.4	6.4	6.4	6.4
96898 17.1-17.4	bedrock	bedrock	99A6307-004.002	U	5.3	5.3	5.3	5.3	5.3	5.3
96898 4.4-4.7	native	native	99A6307-001.002	U	5.2	5.2	5.2	5.2	5.2	5.2



Appendix E  
Real VOC Data

Borehole	Sample Interval	Material	RIN/Event/Bottle	lab_result_qualifier_codes	1,2,4-TRICHLOROBENZENE (ug/kg)	1,2,4-TRIMETHYLBENZENE E (ug/kg)	1,2-CIS-DICHLOROETHYLENE (ug/kg)	1,2-DIBROMO-3-CHLOROPROPANE (ug/kg)	1,2-DIBROMOETHANE E (ug/kg)	1,2-Dichlorobenzene (ug/kg)
96898	8.4-8.7	native	99A6307-002.002	U	5.2	5.2	5.2	5.2	5.2	5.2
96998	12.4-12.7	native	99A6824-003.002	U	5.6	5.6	5.6	5.6	5.6	5.6
96998	17.2-17.8	bedrock	99A6824-004.002	U	5.7	5.7	5.7	5.7	5.7	5.7
96998	4.4-4.8	native	99A6824-001.002	U	5.3	5.3	5.3	5.3	5.3	5.3
96998	8.4-8.8	native	99A6824-002.002	U	5.2	5.2	5.2	5.2	5.2	5.2
97098	12.4-12.6	native	99A6308-003.003	U	5.1	5.1	5.1	5.1	5.1	5.1
97098	16.5-17.0	bedrock	99A6308-004.003	U	5.7	5.7	5.7	5.7	5.7	5.7
97098	4.2-4.7	native	99A6308-001.003	U	5.5	5.5	5.5	5.5	5.5	5.5
97098	8.4-8.8	native	99A6308-002.003	U	5.8	5.8	5.8	5.8	5.8	5.8
97198	12.4-12.8	native	99A4102-002.009	U	650	650		650	650	650
97198	15.5-16.1	native	99A4102-002.012	U	740	740		740	740	740
97198	20.4-20.8	native	99A4102-002.015	U	670	670		670	670	670
97198	24.4-24.8	bedrock	99A4102-002.018	U	700	700		700	700	700
97198	4.4-4.8	native	99A4102-002.006	U	700	700		700	700	700
97198	7.3-7.6	native	99A4102-002.003	U	650	650		650	650	650
97298	12.4-12.8	native	99A6825-003.002	U	5.3	5.3	5.3	5.3	5.3	5.3
97298	16.4-17.0	native	99A6825-004.002	U	5.4	5.4	5.4	5.4	5.4	5.4
97298	17.7-18.2	bedrock	99A6825-005.002	U	6.1	6.1	6.1	6.1	6.1	6.1
97298	4.0-4.4	native	99A6825-001.002	U	5.4	5.4	5.4	5.4	5.4	5.4
97298	8.4-8.8	native	99A6825-002.002	U	5.7	5.7	5.7	5.7	5.7	5.7
97698	11.2-11.6	native	99A8275-003.002	U	5.2	5.2		5.2	5.2	5.2
97698	13.5-13.9	native	99A8275-004.002	U	5.4	5.4		5.4	5.4	5.4
97698	16.3-16.7	native	99A8275-005.002	U	5.3	5.3		5.3	5.3	5.3
97698	18.2-18.8	native	99A8275-008.002	U	5.6	5.6		5.6	5.6	5.6
97698	19.4-19.8	native	99A8275-009.002	U	5.7	5.7		5.7	5.7	5.7
97698	4.6-5.8	native	99A8275-001.002	U	5.3	5.3	5.3	5.3	5.3	5.3
97698	8.2-8.6	native	99A8275-002.002	U	5.3	5.3		5.3	5.3	5.3



Appendix E  
Real VOC Data

Borehole	Sample Interval	Material	RIN/Event/Bottle	lab_result_qualifier_codes	1,2-DICHLOROETHANE (ug/kg)	1,2-Dichloroethane-d4 (ug/kg)	1,2-DICHLOROETHENE (TOTAL) (ug/kg)	1,2-DICHLOROPROPANE (ug/kg)	1,2-TRANS-DICHLOROETHYLENE (ug/kg)	1,3,5-TRIMETHYLBENZENE (ug/kg)
90998	3.8-4.0	native	98A2015-001.010							
91198	11.6-11.9	native	98A1091-001.035			120				
91198	15.5-15.8	native	98A1091-001.036			118				
91198	19.1-19.5	native	98A1091-001.037			86				
91198	19.5-19.8	bedrock	98A1091-001.038							
91198	3.1-3.4	native	98A1091-001.033			117				
91198	7.7-8.0	native	98A1091-001.034			114				
92598	12.0-12.5	native	98A1092-001.035			94				
92598	16.0-16.75	bedrock	98A1092-001.036							
92598	3.5-4.0	native	98A1092-001.033			87				
92598	7.5-8.0	native	98A1092-001.034							
95998	12.4-12.8	native	99A7799-003.002							
95998	14.8-15.2	native	99A7799-004.002							
95998	17.7-18.2	native	99A7799-005.002							
95998	24.6-25.0	bedrock	99A7799-006.002							
95998	5.0-5.6	native	99A7799-001.002							
95998	8.4-8.8	native	99A7799-002.002							
96298	16.1-16.5	bedrock	99A3210-004.017			102				
96498	13-13.5	native	99A3210-001.015			99				
96498	16.0-16.5	native	99A3210-001.016			98				
96498	18.0-18.6	native	99A3210-001.017			94				
96498	22.0-22.5	bedrock	99A3210-001.018			96				
96498	4.8-5.2	native	99A3210-001.013			99				
96498	9.5-10.0	native	99A3210-001.014			100				
96598	11.6-12.0	native	99A6817-003.002							
96598	15.2-15.6	native	99A6817-004.002							
96598	18.6-18.9	native	99A6817-005.002							
96598	22.3-22.7	bedrock	99A6817-006.002							
96598	4.2-4.6	native	99A6817-001.002							
96598	8.4-8.8	native	99A6817-002.002							
96698	12.4-12.8	native	99A6649-003.002							
96698	17.7-18.3	native	99A7930-001.002							
96698	20.2-20.6	native	99A7930-002.002							
96698	22.4-22.8	bedrock	99A7930-003.002							
96698	4.2-4.6	native	99A6649-001.002							
96698	8.2-8.6	native	99A6649-002.002							
96798	12.5-12.9	native	99A6650-003.002							
96798	16.0-16.4	native	99A6650-004.002							
96798	20.4-20.8	native	99A6650-005.002							
96798	8.4-8.8	native	99A6650-002.002							
96898	12.3-12.6	native	99A6307-003.002							
96898	17.1-17.4	bedrock	99A6307-004.002							
96898	4.4-4.7	native	99A6307-001.002							

Appendix E  
Real VOC Data

Borehole	Sample Interval	Material	RIN/Event/Bottle	lab_result_qualifier_codes	1,2-DICHLOROETHANE (ug/kg)	1,2-Dichloroethane-d4 (ug/kg)	1,2-DICHLOROETHENE (TOTAL) (ug/kg)	1,2-DICHLOROPROPANE (ug/kg)	1,2-TRANS-DICHLOROETHYLENE (ug/kg)	1,3,5-TRIMETHYLBENZENE (ug/kg)
96898	8.4-8.7	native	99A6307-002.002							
96998	4.4-4.8	native	99A6824-001.002							
96998	8.4-8.8	native	99A6824-002.002							
97198	20.4-20.8	native	99A4102-002.015			112.1				
97198	24.4-24.8	bedrock	99A4102-002.018			86.16				
97298	12.4-12.8	native	99A6825-003.002							
97298	16.4-17.0	native	99A6825-004.002							
97298	17.7-18.2	bedrock	99A6825-005.002							
97298	4.0-4.4	native	99A6825-001.002							
97298	8.4-8.8	native	99A6825-002.002							
97698	11.2-11.6	native	99A8275-003.002							
97698	13.5-13.9	native	99A8275-004.002							
97698	16.3-16.7	native	99A8275-005.002							
97698	18.2-18.8	native	99A8275-008.002							
97698	19.4-19.8	native	99A8275-009.002							
97698	4.6-5.8	native	99A8275-001.002							
97698	8.2-8.6	native	99A8275-002.002							
90998	3.8-4.0	native	98A2015-001.010	B						
91198	11.6-11.9	native	98A1091-001.035	B						
91198	15.5-15.8	native	98A1091-001.036	B						
91198	19.1-19.5	native	98A1091-001.037	B						
91198	19.5-19.8	bedrock	98A1091-001.038	B						
91198	7.7-8.0	native	98A1091-001.034	B						
92598	12.0-12.5	native	98A1092-001.035	B						
92598	16.0-16.75	bedrock	98A1092-001.036	B						
92598	3.5-4.0	native	98A1092-001.033	B						
92598	7.5-8.0	native	98A1092-001.034	B						
97698	11.2-11.6	native	99A8275-003.002	B						
97698	13.5-13.9	native	99A8275-004.002	B						
97698	16.3-16.7	native	99A8275-005.002	B						
97698	18.2-18.8	native	99A8275-008.002	B						
95998	24.6-25.0	bedrock	99A7799-006.002	BJ						
96598	15.2-15.6	native	99A6817-004.002	BJ						
97198	24.4-24.8	bedrock	99A4102-002.018	BJ						
97698	11.2-11.6	native	99A8275-003.002	BJ						
97698	13.5-13.9	native	99A8275-004.002	BJ						
97698	16.3-16.7	native	99A8275-005.002	BJ						
97698	18.2-18.8	native	99A8275-008.002	BJ						
97698	4.6-5.8	native	99A8275-001.002	BJ						
97698	8.2-8.6	native	99A8275-002.002	BJ						
95998	24.6-25.0	bedrock	99A7799-006.002	E						
95998	5.0-5.6	native	99A7799-001.002	E						
97698	11.2-11.6	native	99A8275-003.002	E						

Appendix E  
Real VOC Data

Borehole	Sample Interval	Material	RIN/Event/Bottle	lab_result_qualifier_codes	1,2-DICHLOROETHANE (ug/kg)	1,2-Dichloroethane-d4 (ug/kg)	1,2-DICHLOROETHENE (TOTAL) (ug/kg)	1,2-DICHLOROPROPANE (ug/kg)	1,2-TRANS-DICHLOROETHYLENE (ug/kg)	1,3,5-TRIMETHYLBENZENE (ug/kg)
97698	13.5-13.9	native	99A8275-004.002	E						
97698	16.3-16.7	native	99A8275-005.002	E						
97698	18.2-18.8	native	99A8275-008.002	E						
90998	3.8-4.0	native	98A2015-001.010	J						
95998	12.4-12.8	native	99A7799-003.002	J						
95998	17.7-18.2	native	99A7799-005.002	J						
95998	24.6-25.0	bedrock	99A7799-006.002	J						
95998	5.0-5.6	native	99A7799-001.002	J						
96198	4.4-4.7	native	99A3210-003.013	J						
96398	12.4-12.7	native	99A4102-001.009	J						
96398	16.2-16.4	bedrock	99A4102-001.012	J						
96398	4.3-4.8	native	99A4102-001.003	J						
96398	8.4-8.9	native	99A4102-001.006	J						
96498	4.8-5.2	native	99A3210-001.013	J						
96598	11.6-12.0	native	99A6817-003.002	J						
96598	22.3-22.7	bedrock	99A6817-006.002	J						
96598	8.4-8.8	native	99A6817-002.002	J						
96698	12.4-12.8	native	99A6649-003.002	J						
96698	17.7-18.3	native	99A7930-001.002	J						
96698	20.2-20.6	native	99A7930-002.002	J						
96698	22.4-22.8	bedrock	99A7930-003.002	J						
96798	12.5-12.9	native	99A6650-003.002	J						
96798	16.0-16.4	native	99A6650-004.002	J						
96798	20.4-20.8	native	99A6650-005.002	J						
96798	8.4-8.8	native	99A6650-002.002	J						
96898	17.1-17.4	bedrock	99A6307-004.002	J						
96998	4.4-4.8	native	99A6824-001.002	J						
96998	8.4-8.8	native	99A6824-002.002	J						
97098	4.2-4.7	native	99A6308-001.003	J						
97098	8.4-8.8	native	99A6308-002.003	J						
97198	12.4-12.8	native	99A4102-002.009	J						
97198	15.5-16.1	native	99A4102-002.012	J						
97198	4.4-4.8	native	99A4102-002.006	J						
97198	7.3-7.6	native	99A4102-002.003	J						
97298	12.4-12.8	native	99A6825-003.002	J						
97298	4.0-4.4	native	99A6825-001.002	J						
97298	8.4-8.8	native	99A6825-002.002	J						
97698	11.2-11.6	native	99A8275-003.002	J						
97698	13.5-13.9	native	99A8275-004.002	J						
97698	16.3-16.7	native	99A8275-005.002	J						
97698	18.2-18.8	native	99A8275-008.002	J						
97698	19.4-19.8	native	99A8275-009.002	J						
97698	8.2-8.6	native	99A8275-002.002	J						

Appendix E  
Real VOC Data

Borehole	Sample Interval	Material	RIN/Event/Bottle	lab_result_qualifier_codes	1,2-DICHLOROETHANE (ug/kg)	1,2-Dichloroethane-d4 (ug/kg)	1,2-DICHLOROETHENE (TOTAL) (ug/kg)	1,2-DICHLOROPROPANE (ug/kg)	1,2-TRANS-DICHLOROETHYLENE (ug/kg)	1,3,5-TRIMETHYLBENZENE (ug/kg)
91198	11.6-11.9	native	98A1091-001.035	JB						
91198	15.5-15.8	native	98A1091-001.036	JB						
91198	3.1-3.4	native	98A1091-001.033	JB						
91198	7.7-8.0	native	98A1091-001.034	JB						
92598	12.0-12.5	native	98A1092-001.035	JB						
92598	16.0-16.75	bedrock	98A1092-001.036	JB						
96598	22.3-22.7	bedrock	99A6817-006.002	JB						
96698	12.4-12.8	native	99A6649-003.002	JB						
96698	4.2-4.6	native	99A6649-001.002	JB						
96698	8.2-8.6	native	99A6649-002.002	JB						
96798	12.5-12.9	native	99A6650-003.002	JB						
96798	16.0-16.4	native	99A6650-004.002	JB						
96798	20.4-20.8	native	99A6650-005.002	JB						
96798	4.4-4.8	native	99A6650-001.002	JB						
96798	8.4-8.8	native	99A6650-002.002	JB						
96898	12.3-12.6	native	99A6307-003.002	JB						
96898	17.1-17.4	bedrock	99A6307-004.002	JB						
96898	4.4-4.7	native	99A6307-001.002	JB						
96898	8.4-8.7	native	99A6307-002.002	JB						
96998	12.4-12.7	native	99A6824-003.002	JB						
96998	17.2-17.8	bedrock	99A6824-004.002	JB						
96998	4.4-4.8	native	99A6824-001.002	JB						
96998	8.4-8.8	native	99A6824-002.002	JB						
97098	16.5-17.0	bedrock	99A6308-004.003	JB						
97298	16.4-17.0	native	99A8825-004.002	JB						
97298	17.7-18.2	bedrock	99A8825-005.002	JB						
97698	19.4-19.8	native	99A8275-009.002	JB						
90998	3.8-4.0	native	98A2015-001.010	U	790			790		790
91198	11.6-11.9	native	98A1091-001.035	U				690		690
91198	15.5-15.8	native	98A1091-001.036	U				680		680
91198	19.1-19.5	native	98A1091-001.037	U				630		630
91198	19.5-19.8	bedrock	98A1091-001.038	U				620		620
91198	3.1-3.4	native	98A1091-001.033	U	620			710		710
91198	7.7-8.0	native	98A1091-001.034	U				680		680
92598	12.0-12.5	native	98A1092-001.035	U				700		700
92598	16.0-16.75	bedrock	98A1092-001.036	U	720			720		720
92598	3.5-4.0	native	98A1092-001.033	U				650		650
92598	7.5-8.0	native	98A1092-001.034	U	610			610		610
95998	12.4-12.8	native	99A7799-003.002	U	5.8			5.8	5.8	5.8
95998	14.8-15.2	native	99A7799-004.002	U	5.3			5.3	5.3	5.3
95998	17.7-18.2	native	99A7799-005.002	U	5.6			5.6	5.6	5.6
95998	24.6-25.0	bedrock	99A7799-006.002	U	6.3			6.3	6.3	6.3
95998	5.0-5.6	native	99A7799-001.002	U	5.6			5.6	5.6	5.6

Appendix E  
Real VOC Data

Borehole	Sample Interval	Material	RIN/Event/Bottle	lab_result_qualifier_codes	1,2-DICHLOROETHANE (ug/kg)	1,2-Dichloroethane-d4 (ug/kg)	DICHLOROETHEN E(TOTAL) (ug/kg)	1,2-DICHLOROPROPANE (ug/kg)	1,2-TRANS-DICHLOROETHYLENE (ug/kg)	1,3,5-TRIMETHYLBENZENE (ug/kg)
95998 8.4-8.8	native	native	99A7799-002.002	U	5.2			5.2	5.2	5.2
96098 12.5-13.0	native	native	99A3210-002.015	U	700			700	700	700
96098 16.0-16.2	bedrock	bedrock	99A3210-002.016	U	700			700	700	700
96098 4.5-4.8	native	native	99A3210-002.013	U	730			730	730	730
96098 8.5-8.8	native	native	99A3210-002.014	U	690			690	690	690
96198 12.0-12.5	native	native	99A3210-003.015	U	760			760	760	760
96198 15.8-16.2	bedrock	bedrock	99A3210-003.016	U	700			700	700	700
96198 4.4-4.7	native	native	99A3210-003.013	U				700	700	700
96198 8.1-8.5	native	native	99A3210-003.014	U	670			670	670	670
96298 12.25-12.75	native	native	99A3210-004.016	U	750			750	750	750
96298 16.1-16.5	bedrock	bedrock	99A3210-004.017	U	720			720	720	720
96298 4.3-4.7	native	native	99A3210-004.013	U	700			700	700	700
96298 8.0-9.0	native	native	99A3210-004.014	U	670			670	670	670
96398 12.4-12.7	native	native	99A4102-001.009	U	710			710	710	710
96398 16.2-16.4	bedrock	bedrock	99A4102-001.012	U	730			730	730	730
96398 4.3-4.8	native	native	99A4102-001.003	U	700			700	700	700
96398 8.4-8.9	native	native	99A4102-001.006	U	710			710	710	710
96498 13-13.5	native	native	99A3210-001.015	U	1300		1300	1300		
96498 16.0-16.5	native	native	99A3210-001.016	U	1300		1300	1300		
96498 18.0-18.6	native	native	99A3210-001.017	U	1300		1300	1300		
96498 22.0-22.5	bedrock	bedrock	99A3210-001.018	U	1500		1500	1500		
96498 4.8-5.2	native	native	99A3210-001.013	U	1500		1500	1500		
96498 9.5-10.0	native	native	99A3210-001.014	U	1300		1300	1300		
96598 11.6-12.0	native	native	99A6817-003.002	U	5.4			5.4	5.4	5.4
96598 15.2-15.6	native	native	99A6817-004.002	U	6			6	6	6
96598 18.6-18.9	native	native	99A6817-005.002	U	5.3			5.3	5.3	5.3
96598 22.3-22.7	bedrock	bedrock	99A6817-006.002	U	6.2			6.2	6.2	6.2
96598 4.2-4.6	native	native	99A6817-001.002	U	5.7			5.7	5.7	5.7
96598 8.4-8.8	native	native	99A6817-002.002	U	5.3			5.3	5.3	5.3
96698 12.4-12.8	native	native	99A6649-003.002	U	5.9			5.9	5.9	5.9
96698 17.7-18.3	native	native	99A7930-001.002	U	5.6			5.6	5.6	5.6
96698 20.2-20.6	native	native	99A7930-002.002	U	5.4			5.4	5.4	5.4
96698 22.4-22.8	bedrock	bedrock	99A7930-003.002	U	6.4			6.4	6.4	6.4
96698 4.2-4.6	native	native	99A6649-001.002	U	5.7			5.7	5.7	5.7
96698 8.2-8.6	native	native	99A6649-002.002	U	5.6			5.6	5.6	5.6
96798 12.5-12.9	native	native	99A6650-003.002	U	6.2			6.2	6.2	6.2
96798 16.0-16.4	native	native	99A6650-004.002	U	7.2			7.2	7.2	7.2
96798 20.4-20.8	native	native	99A6650-005.002	U	7.4			7.4	7.4	7.4
96798 4.4-4.8	native	native	99A6650-001.002	U	5.3			5.3	5.3	5.3
96798 8.4-8.8	native	native	99A6650-002.002	U	6.3			6.3	6.3	6.3
96898 12.3-12.6	native	native	99A6307-003.002	U	6.4			6.4	6.4	6.4
96898 17.1-17.4	bedrock	bedrock	99A6307-004.002	U	5.3			5.3	5.3	5.3
96898 4.4-4.7	native	native	99A6307-001.002	U	5.2			5.2	5.2	5.2

Appendix E  
Real VOC Data

Borehole	Sample Interval	Material	RIN/Event/Bottle	lab_result_qualifier_codes	1,2-Dichloroethane-d4 (ug/kg)	1,2-Dichloroethene E(TOTAL) (ug/kg)	1,2-Dichloropropane (ug/kg)	1,2-TRANS-Dichloroethylene (ug/kg)	1,3,5-Trimethylbenzene (ug/kg)
96998 8.4-8.7	native	99A6307-002.002	U	5.2			5.2	5.2	5.2
96998 12.4-12.7	native	99A6824-003.002	U	5.6			5.6	5.6	5.6
96998 17.2-17.8	bedrock	99A6824-004.002	U	5.7			5.7	5.7	5.7
96998 4.4-4.8	native	99A6824-001.002	U	5.3			5.3	5.3	5.3
96998 8.4-8.8	native	99A6824-002.002	U	5.2			5.2	5.2	5.2
97098 12.4-12.6	native	99A6308-003.003	U	5.1			5.1	5.1	5.1
97098 16.5-17.0	bedrock	99A6308-004.003	U	5.7			5.7	5.7	5.7
97098 4.2-4.7	native	99A6308-001.003	U	5.5			5.5	5.5	5.5
97098 8.4-8.8	native	99A6308-002.003	U	5.8			5.8	5.8	5.8
97198 12.4-12.8	native	99A4102-002.009	U	650			650	650	650
97198 15.5-16.1	native	99A4102-002.012	U	740			740	740	740
97198 20.4-20.8	native	99A4102-002.015	U	670			670	670	670
97198 24.4-24.8	bedrock	99A4102-002.018	U	700			700	700	700
97198 4.4-4.8	native	99A4102-002.006	U	700			700	700	700
97198 7.3-7.6	native	99A4102-002.003	U	650			650	650	650
97298 12.4-12.8	native	99A6825-003.002	U	5.3			5.3	5.3	5.3
97298 16.4-17.0	native	99A6825-004.002	U	5.4			5.4	5.4	5.4
97298 17.7-18.2	bedrock	99A6825-005.002	U	6.1			6.1	6.1	6.1
97298 4.0-4.4	native	99A6825-001.002	U	5.4			5.4	5.4	5.4
97298 8.4-8.8	native	99A6825-002.002	U	5.7			5.7	5.7	5.7
97698 11.2-11.6	native	99A8275-003.002	U	5.2			5.2	5.2	5.2
97698 13.5-13.9	native	99A8275-004.002	U	5.4			5.4	5.4	5.4
97698 16.3-16.7	native	99A8275-005.002	U	5.3			5.3	5.3	5.3
97698 18.2-18.8	native	99A8275-008.002	U	5.6			5.6	5.6	5.6
97698 19.4-19.8	native	99A8275-009.002	U	5.7			5.7	5.7	5.7
97698 4.6-5.8	native	99A8275-001.002	U	5.3			5.3	5.3	5.3
97698 8.2-8.6	native	99A8275-002.002	U	5.3			5.3	5.3	5.3

Appendix E  
Real VOC Data

Borehole	Sample Interval	Material	RIN/Event/Bottle	lab_result_qualifier_codes	1,3-DICHLOROBENZENE (ug/kg)	1,3-DICHLOROPROPANE (ug/kg)	1,4-DICHLOROBENZENE (ug/kg)	2,2-DICHLOROPROPANE (ug/kg)	2-BUTANONE (ug/kg)
90998	3.8-4.0	native	98A2015-001.010						
91198	11.6-11.9	native	98A1091-001.035						
91198	15.5-15.8	native	98A1091-001.036						
91198	19.1-19.5	native	98A1091-001.037						
91198	19.5-19.8	bedrock	98A1091-001.038						
91198	3.1-3.4	native	98A1091-001.033						
91198	7.7-8.0	native	98A1091-001.034						
92598	12.0-12.5	native	98A1092-001.035						
92598	16.0-16.75	bedrock	98A1092-001.036						
92598	3.5-4.0	native	98A1092-001.033						
92598	7.5-8.0	native	98A1092-001.034						
95998	12.4-12.8	native	99A7799-003.002						
95998	14.8-15.2	native	99A7799-004.002						
95998	17.7-18.2	native	99A7799-005.002						
95998	24.6-25.0	bedrock	99A7799-006.002						
95998	5.0-5.6	native	99A7799-001.002						
95998	8.4-8.8	native	99A7799-002.002						
96298	16.1-16.5	bedrock	99A3210-004.017						
96498	13-13.5	native	99A3210-001.015						
96498	16.0-16.5	native	99A3210-001.016						
96498	18.0-18.6	native	99A3210-001.017						
96498	22.0-22.5	bedrock	99A3210-001.018						
96498	4.8-5.2	native	99A3210-001.013						
96498	9.5-10.0	native	99A3210-001.014						
96598	11.6-12.0	native	99A6817-003.002						
96598	15.2-15.6	native	99A6817-004.002						
96598	18.6-18.9	native	99A6817-005.002						
96598	22.3-22.7	bedrock	99A6817-006.002						
96598	4.2-4.6	native	99A6817-001.002						
96598	8.4-8.8	native	99A6817-002.002						
96698	12.4-12.8	native	99A6649-003.002						
96698	17.7-18.3	native	99A7930-001.002						
96698	20.2-20.6	native	99A7930-002.002						
96698	22.4-22.8	bedrock	99A7930-003.002						
96698	4.2-4.6	native	99A6649-001.002						
96698	8.2-8.6	native	99A6649-002.002						
96798	12.5-12.9	native	99A6650-003.002						
96798	16.0-16.4	native	99A6650-004.002						
96798	20.4-20.8	native	99A6650-005.002						
96798	8.4-8.8	native	99A6650-002.002						
96898	12.3-12.6	native	99A6307-003.002						
96898	17.1-17.4	bedrock	99A6307-004.002						
96898	4.4-4.7	native	99A6307-001.002						



Appendix E  
Real VOC Data

Borehole	Sample Interval	Material	RIN/Event/Bottle	lab_result_qualifier_codes	1,3-DICHLOROBENZENE (ug/kg)	1,3-DICHLOROPROPANE (ug/kg)	1,4-DICHLOROBENZENE (ug/kg)	2,2-DICHLOROPROPANE (ug/kg)	2-BUTANONE (ug/kg)
96898	8.4-8.7	native	99A6307-002.002						
96998	4.4-4.8	native	99A6824-001.002						
96998	8.4-8.8	native	99A6824-002.002						
97198	20.4-20.8	native	99A4102-002.015						
97198	24.4-24.8	bedrock	99A4102-002.018						
97298	12.4-12.8	native	99A6825-003.002						
97298	16.4-17.0	native	99A6825-004.002						
97298	17.7-18.2	bedrock	99A6825-005.002						
97298	4.0-4.4	native	99A6825-001.002						
97298	8.4-8.8	native	99A6825-002.002						
97698	11.2-11.6	native	99A8275-003.002						
97698	13.5-13.9	native	99A8275-004.002						
97698	16.3-16.7	native	99A8275-005.002						
97698	18.2-18.8	native	99A8275-008.002						
97698	19.4-19.8	native	99A8275-009.002						
97698	4.6-5.8	native	99A8275-001.002						
97698	8.2-8.6	native	99A8275-002.002						
90998	3.8-4.0	native	98A2015-001.010	B					
91198	11.6-11.9	native	98A1091-001.035	B					
91198	15.5-15.8	native	98A1091-001.036	B					
91198	19.1-19.5	native	98A1091-001.037	B					
91198	19.5-19.8	bedrock	98A1091-001.038	B					
91198	7.7-8.0	native	98A1091-001.034	B					
92598	12.0-12.5	native	98A1092-001.035	B					
92598	16.0-16.75	bedrock	98A1092-001.036	B					
92598	3.5-4.0	native	98A1092-001.033	B					
92598	7.5-8.0	native	98A1092-001.034	B					
97698	11.2-11.6	native	99A8275-003.002	B					
97698	13.5-13.9	native	99A8275-004.002	B					
97698	16.3-16.7	native	99A8275-005.002	B					
97698	18.2-18.8	native	99A8275-008.002	B					
95998	24.6-25.0	bedrock	99A7799-006.002	BJ					
96598	15.2-15.6	native	99A6817-004.002	BJ					
97198	24.4-24.8	bedrock	99A4102-002.018	BJ					
97698	11.2-11.6	native	99A8275-003.002	BJ					
97698	13.5-13.9	native	99A8275-004.002	BJ					
97698	16.3-16.7	native	99A8275-005.002	BJ					
97698	18.2-18.8	native	99A8275-008.002	BJ					
97698	4.6-5.8	native	99A8275-001.002	BJ					
97698	8.2-8.6	native	99A8275-002.002	BJ					
95998	24.6-25.0	bedrock	99A7799-006.002	E					
95998	5.0-5.6	native	99A7799-001.002	E					
97698	11.2-11.6	native	99A8275-003.002	E					



Appendix E  
Real VOC Data

Borehole	Sample Interval	Material	RIN/Event/Bottle	lab_result_qualifier_codes	1,3-DICHLOROBENZENE (ug/kg)	1,3-DICHLOROPROPANE (ug/kg)	1,4-DICHLOROBENZENE (ug/kg)	2,2-DICHLOROPROPANE (ug/kg)	2-BUTANONE (ug/kg)
97698	13.5-13.9	native	99A8275-004.002	E					
97698	16.3-16.7	native	99A8275-005.002	E					
97698	18.2-18.8	native	99A8275-008.002	E					
90998	3.8-4.0	native	98A2015-001.010	J					
95998	12.4-12.8	native	99A7799-003.002	J					
95998	17.7-18.2	native	99A7799-005.002	J					
95998	24.6-25.0	bedrock	99A7799-006.002	J					
95998	5.0-5.6	native	99A7799-001.002	J					
96198	4.4-4.7	native	99A3210-003.013	J					
96398	12.4-12.7	native	99A4102-001.009	J					
96398	16.2-16.4	bedrock	99A4102-001.012	J					
96398	4.3-4.8	native	99A4102-001.003	J					
96398	8.4-8.9	native	99A4102-001.006	J					
96498	4.8-5.2	native	99A3210-001.013	J					
96598	11.6-12.0	native	99A8817-003.002	J					
96598	22.3-22.7	bedrock	99A6817-006.002	J					
96598	8.4-8.8	native	99A6817-002.002	J					
96698	12.4-12.8	native	99A6649-003.002	J					
96698	17.7-18.3	native	99A7930-001.002	J					
96698	20.2-20.6	native	99A7930-002.002	J					
96698	22.4-22.8	bedrock	99A7930-003.002	J					
96798	12.5-12.9	native	99A6650-003.002	J					
96798	16.0-16.4	native	99A6650-004.002	J					
96798	20.4-20.8	native	99A6650-005.002	J					
96798	8.4-8.8	native	99A6650-002.002	J					
96898	17.1-17.4	bedrock	99A6307-004.002	J					
96998	4.4-4.8	native	99A6824-001.002	J					
96998	8.4-8.8	native	99A6824-002.002	J					
97098	4.2-4.7	native	99A6308-001.003	J					
97098	8.4-8.8	native	99A6308-002.003	J					
97198	12.4-12.8	native	99A4102-002.009	J					
97198	15.5-16.1	native	99A4102-002.012	J					
97198	4.4-4.8	native	99A4102-002.006	J					
97198	7.3-7.6	native	99A4102-002.003	J					
97298	12.4-12.8	native	99A6825-003.002	J					
97298	4.0-4.4	native	99A6825-001.002	J					
97298	8.4-8.8	native	99A6825-002.002	J					
97698	11.2-11.6	native	99A8275-003.002	J					
97698	13.5-13.9	native	99A8275-004.002	J					
97698	16.3-16.7	native	99A8275-005.002	J					
97698	18.2-18.8	native	99A8275-008.002	J					
97698	19.4-19.8	native	99A8275-009.002	J					
97698	8.2-8.6	native	99A8275-002.002	J					

Appendix E  
Real VOC Data

Borehole	Sample Interval	Material	RIN/Event/Bottle	lab_result_qualifier_codes	1,3-DICHLOROBENZENE (ug/kg)	1,3-DICHLOROPROPANE (ug/kg)	1,4-DICHLOROBENZENE (ug/kg)	2,2-DICHLOROPROPANE (ug/kg)	2-BUTANONE (ug/kg)
91198	11.6-11.9	native	98A1091-001.035	JB					
91198	15.5-15.8	native	98A1091-001.036	JB					
91198	3.1-3.4	native	98A1091-001.033	JB					
91198	7.7-8.0	native	98A1091-001.034	JB					
92598	12.0-12.5	native	98A1092-001.035	JB					
92598	16.0-16.75	bedrock	98A1092-001.036	JB					
96598	22.3-22.7	bedrock	99A6817-006.002	JB					
96598	12.4-12.8	native	99A6649-003.002	JB					
96598	4.2-4.6	native	99A6649-001.002	JB					
96598	8.2-8.6	native	99A6649-002.002	JB					
96798	12.5-12.9	native	99A6650-003.002	JB					
96798	16.0-16.4	native	99A6650-004.002	JB					
96798	20.4-20.8	native	99A6650-005.002	JB					
96798	4.4-4.8	native	99A6650-001.002	JB					
96798	8.4-8.8	native	99A6650-002.002	JB					
96898	12.3-12.6	native	99A6307-003.002	JB					
96898	17.1-17.4	bedrock	99A6307-004.002	JB					
96898	4.4-4.7	native	99A6307-001.002	JB					
96898	8.4-8.7	native	99A6307-002.002	JB					
96998	12.4-12.7	native	99A6824-003.002	JB					
96998	17.2-17.8	bedrock	99A6824-004.002	JB					
96998	4.4-4.8	native	99A6824-001.002	JB					
96998	8.4-8.8	native	99A6824-002.002	JB					
97098	16.5-17.0	bedrock	99A6308-004.003	JB					
97298	16.4-17.0	native	99A6825-004.002	JB					
97298	17.7-18.2	bedrock	99A6825-005.002	JB					
97698	19.4-19.8	native	99A8275-009.002	JB					
90998	3.8-4.0	native	98A2015-001.010	U	790	790	790	790	1600
91198	11.6-11.9	native	98A1091-001.035	U	690	690	690	690	1400
91198	15.5-15.8	native	98A1091-001.036	U	680	680	680	680	1400
91198	19.1-19.5	native	98A1091-001.037	U	630	630	630	630	1300
91198	19.5-19.8	bedrock	98A1091-001.038	U	620	620	620	620	1200
91198	3.1-3.4	native	98A1091-001.033	U	710	710	710	710	1400
91198	7.7-8.0	native	98A1091-001.034	U	680	680	680	680	1400
92598	12.0-12.5	native	98A1092-001.035	U	700	700	700	700	1400
92598	16.0-16.75	bedrock	98A1092-001.036	U	720	720	720	720	1400
92598	3.5-4.0	native	98A1092-001.033	U	650	650	650	650	1300
92598	7.5-8.0	native	98A1092-001.034	U	610	610	610	610	1200
95998	12.4-12.8	native	99A7799-003.002	U	5.8	5.8	5.8	5.8	116
95998	14.8-15.2	native	99A7799-004.002	U	5.3	5.3	5.3	5.3	106
95998	17.7-18.2	native	99A7799-005.002	U	5.6	5.6	5.6	5.6	111
95998	24.6-25.0	bedrock	99A7799-006.002	U	6.3	6.3	6.3	6.3	126
95998	5.0-5.6	native	99A7799-001.002	U	5.6	5.6	5.6	5.6	111

Appendix E  
Real VOC Data

Borehole	Sample Interval	Material	RIN/Event/Bottle	lab_result_qualifier_codes	1,3-DICHLOROBENZENE (ug/kg)	1,3-DICHLOROPROPANE (ug/kg)	1,4-DICHLOROBENZENE (ug/kg)	2,2-DICHLOROPROPANE (ug/kg)	2-BUTANONE (ug/kg)
95998 8.4-8.8		native	99A7799-002.002	U			5.2	5.2	103
96098 12.5-13.0		native	99A3210-002.015	U	700		700	700	700
96098 16.0-16.2		bedrock	99A3210-002.016	U	700		700	700	700
96098 4.5-4.8		native	99A3210-002.013	U	730		730	730	730
96098 8.5-8.8		native	99A3210-002.014	U	690		690	690	690
96198 12.0-12.5		native	99A3210-003.015	U	760		760	760	760
96198 15.8-16.2		bedrock	99A3210-003.016	U	700		700	700	700
96198 4.4-4.7		native	99A3210-003.013	U	700		700	700	700
96198 8.1-8.5		native	99A3210-003.014	U	670		670	670	670
96298 12.25-12.75		native	99A3210-004.016	U	750		750	750	750
96298 16.1-16.5		bedrock	99A3210-004.017	U	720		720	720	720
96298 4.3-4.7		native	99A3210-004.013	U	700		700	700	700
96298 8.0-9.0		native	99A3210-004.014	U	670		670	670	670
96398 12.4-12.7		native	99A4102-001.009	U	710		710	710	710
96398 16.2-16.4		bedrock	99A4102-001.012	U	730		730	730	730
96398 4.3-4.8		native	99A4102-001.003	U	700		700	700	700
96398 8.4-8.9		native	99A4102-001.006	U	710		710	710	710
96498 13-13.5		native	99A3210-001.015	U					1300
96498 16.0-16.5		native	99A3210-001.016	U					1300
96498 18.0-18.6		native	99A3210-001.017	U					1300
96498 22.0-22.5		bedrock	99A3210-001.018	U					1500
96498 4.8-5.2		native	99A3210-001.013	U					1500
96498 9.5-10.0		native	99A3210-001.014	U					1300
96598 11.6-12.0		native	99A6817-003.002	U		5.4		5.4	108
96598 15.2-15.6		native	99A6817-004.002	U		6		6	120
96598 18.6-18.9		native	99A6817-005.002	U		5.3		5.3	106
96598 22.3-22.7		bedrock	99A6817-006.002	U		6.2		6.2	125
96598 4.2-4.6		native	99A6817-001.002	U		5.7		5.7	114
96598 8.4-8.8		native	99A6817-002.002	U		5.3		5.3	105
96698 12.4-12.8		native	99A6649-003.002	U		5.9		5.9	118
96698 17.7-18.3		native	99A7930-001.002	U		5.6		5.6	111
96698 20.2-20.6		native	99A7930-002.002	U		5.4		5.4	108
96698 22.4-22.8		bedrock	99A7930-003.002	U		6.4		6.4	128
96698 4.2-4.6		native	99A6649-001.002	U		5.7		5.7	114
96698 8.2-8.6		native	99A6649-002.002	U		5.6		5.6	111
96798 12.5-12.9		native	99A6650-003.002	U		6.2		6.2	124
96798 16.0-16.4		native	99A6650-004.002	U		7.2		7.2	144
96798 20.4-20.8		native	99A6650-005.002	U		7.4		7.4	149
96798 4.4-4.8		native	99A6650-001.002	U		5.3		5.3	106
96798 8.4-8.8		native	99A6650-002.002	U		6.3		6.3	126
96898 12.3-12.6		native	99A6307-003.002	U		6.4		6.4	128
96898 17.1-17.4		bedrock	99A6307-004.002	U		5.3		5.3	105
96898 4.4-4.7		native	99A6307-001.002	U		5.2		5.2	103

Appendix E  
Real VOC Data

Borehole	Sample Interval	Material	RIN/Event/Bottle	lab_result_qualifier_codes	1,3-DICHLOROBENZENE (ug/kg)	1,3-DICHLOROPROPANE (ug/kg)	1,4-DICHLOROBENZENE (ug/kg)	2,2-DICHLOROPROPANE (ug/kg)	2-BUTANONE (ug/kg)
96998	8.4-8.7	native	99A6307-002.002	U		5.2		5.2	103
96998	12.4-12.7	native	99A6824-003.002	U		5.6		5.6	113
96998	17.2-17.8	bedrock	99A6824-004.002	U		5.7		5.7	114
96998	4.4-4.8	native	99A6824-001.002	U		5.3		5.3	106
96998	8.4-8.8	native	99A6824-002.002	U		5.2		5.2	105
97098	12.4-12.6	native	99A6308-003.003	U		5.1		5.1	102
97098	16.5-17.0	bedrock	99A6308-004.003	U		5.7		5.7	114
97098	4.2-4.7	native	99A6308-001.003	U		5.5		5.5	110
97098	8.4-8.8	native	99A6308-002.003	U		5.8		5.8	116
97198	12.4-12.8	native	99A4102-002.009	U	650	650	650	650	650
97198	15.5-16.1	native	99A4102-002.012	U	740	740	740	740	740
97198	20.4-20.8	native	99A4102-002.015	U	670	670	670	670	670
97198	24.4-24.8	bedrock	99A4102-002.018	U	700	700	700	700	700
97198	4.4-4.8	native	99A4102-002.006	U	700	700	700	700	700
97198	7.3-7.6	native	99A4102-002.003	U	650	650	650	650	650
97298	12.4-12.8	native	99A6825-003.002	U		5.3		5.3	106
97298	16.4-17.0	native	99A6825-004.002	U		5.4		5.4	107
97298	17.7-18.2	bedrock	99A6825-005.002	U		6.1		6.1	122
97298	4.0-4.4	native	99A6825-001.002	U		5.4		5.4	109
97298	8.4-8.8	native	99A6825-002.002	U		5.7		5.7	114
97698	11.2-11.6	native	99A8275-003.002	U		5.2		5.2	104
97698	13.5-13.9	native	99A8275-004.002	U		5.4		5.4	109
97698	16.3-16.7	native	99A8275-005.002	U		5.3		5.3	105
97698	18.2-18.8	native	99A8275-008.002	U		5.6		5.6	111
97698	19.4-19.8	native	99A8275-009.002	U		5.7		5.7	114
97698	4.6-5.8	native	99A8275-001.002	U		5.3		5.3	106
97698	8.2-8.6	native	99A8275-002.002	U		5.3		5.3	105

Appendix E  
Real VOC Data

Borehole	Sample Interval	Material	RIN/Event/Bottle	lab_result_qualifier_codes	2-CHLOROTOLUENE (ug/kg)	2-HEXANONE (ug/kg)	4-CHLOROTOLUENE (ug/kg)	4-ISOPROPYLTOLUENE (ug/kg)	4-METHYL-2-PENTANONE (ug/kg)	ACETONE (ug/kg)
90998	3.8-4.0	native	98A2015-001.010							
91198	11.6-11.9	native	98A1091-001.035							
91198	15.5-15.8	native	98A1091-001.036							
91198	19.1-19.5	native	98A1091-001.037							
91198	19.5-19.8	bedrock	98A1091-001.038							
91198	3.1-3.4	native	98A1091-001.033							
91198	7.7-8.0	native	98A1091-001.034							
92598	12.0-12.5	native	98A1092-001.035							
92598	16.0-16.75	bedrock	98A1092-001.036							
92598	3.5-4.0	native	98A1092-001.033							
92598	7.5-8.0	native	98A1092-001.034							
95998	12.4-12.8	native	99A7799-003.002							
95998	14.8-15.2	native	99A7799-004.002							
95998	17.7-18.2	native	99A7799-005.002							
95998	24.6-25.0	bedrock	99A7799-006.002							
95998	5.0-5.6	native	99A7799-001.002							
95998	8.4-8.8	native	99A7799-002.002							
96298	16.1-16.5	bedrock	99A3210-004.017							
96498	13-13.5	native	99A3210-001.015							
96498	16.0-16.5	native	99A3210-001.016							
96498	18.0-18.6	native	99A3210-001.017							
96498	22.0-22.5	bedrock	99A3210-001.018							
96498	4.8-5.2	native	99A3210-001.013							
96498	9.5-10.0	native	99A3210-001.014							
96598	11.6-12.0	native	99A6817-003.002							
96598	15.2-15.6	native	99A6817-004.002							
96598	18.6-18.9	native	99A6817-005.002							
96598	22.3-22.7	bedrock	99A6817-006.002							
96598	4.2-4.6	native	99A6817-001.002							
96598	8.4-8.8	native	99A6817-002.002							
96698	12.4-12.8	native	99A6649-003.002							
96698	17.7-18.3	native	99A7930-001.002							
96698	20.2-20.6	native	99A7930-002.002							
96698	22.4-22.8	bedrock	99A7930-003.002							
96698	4.2-4.6	native	99A6649-001.002							
96698	8.2-8.6	native	99A6649-002.002							
96798	12.5-12.9	native	99A6650-003.002							
96798	16.0-16.4	native	99A6650-004.002							
96798	20.4-20.8	native	99A6650-005.002							
96798	8.4-8.8	native	99A6650-002.002							
96898	12.3-12.6	native	99A6307-003.002							
96898	17.1-17.4	bedrock	99A6307-004.002							
96898	4.4-4.7	native	99A6307-001.002							

Appendix E  
Real VOC Data

Borehole	Sample Interval	Material	RIN/Event/Bottle	lab_result_qualifier_codes	2-CHLOROTOLUENE (ug/kg)	2-HEXANONE (ug/kg)	4-CHLOROTOLUENE (ug/kg)	4-ISOPROPYLTOLUENE (ug/kg)	4-METHYL-2-PENTANONE (ug/kg)	ACETONE (ug/kg)
96898	8.4-8.7	native	99A6307-002.002							
96998	4.4-4.8	native	99A6824-001.002							
96998	8.4-8.8	native	99A6824-002.002							
97198	20.4-20.8	native	99A4102-002.015							
97198	24.4-24.8	bedrock	99A4102-002.018							
97298	12.4-12.8	native	99A6825-003.002							
97298	16.4-17.0	native	99A6825-004.002							
97298	17.7-18.2	bedrock	99A6825-005.002							
97298	4.0-4.4	native	99A6825-001.002							
97298	8.4-8.8	native	99A6825-002.002							
97698	11.2-11.6	native	99A8275-003.002							124
97698	13.5-13.9	native	99A8275-004.002							138
97698	16.3-16.7	native	99A8275-005.002							137
97698	18.2-18.8	native	99A8275-008.002							135
97698	19.4-19.8	native	99A8275-009.002							
97698	4.6-5.8	native	99A8275-001.002							
97698	8.2-8.6	native	99A8275-002.002							
90998	3.8-4.0	native	98A2015-001.010	B						
91198	11.6-11.9	native	98A1091-001.035	B						
91198	15.5-15.8	native	98A1091-001.036	B						
91198	19.1-19.5	native	98A1091-001.037	B						
91198	19.5-19.8	bedrock	98A1091-001.038	B						
91198	7.7-8.0	native	98A1091-001.034	B						
92598	12.0-12.5	native	98A1092-001.035	B						
92598	16.0-16.75	bedrock	98A1092-001.036	B						
92598	3.5-4.0	native	98A1092-001.033	B						
92598	7.5-8.0	native	98A1092-001.034	B						
97698	11.2-11.6	native	99A8275-003.002	B						
97698	13.5-13.9	native	99A8275-004.002	B						
97698	16.3-16.7	native	99A8275-005.002	B						
97698	18.2-18.8	native	99A8275-008.002	B						
95998	24.6-25.0	bedrock	99A7799-006.002	BJ						
96598	15.2-15.6	native	99A6817-004.002	BJ						
97198	24.4-24.8	bedrock	99A4102-002.018	BJ						
97698	11.2-11.6	native	99A8275-003.002	BJ						
97698	13.5-13.9	native	99A8275-004.002	BJ						
97698	16.3-16.7	native	99A8275-005.002	BJ						
97698	18.2-18.8	native	99A8275-008.002	BJ						
97698	4.6-5.8	native	99A8275-001.002	BJ						
97698	8.2-8.6	native	99A8275-002.002	BJ						
95998	24.6-25.0	bedrock	99A7799-006.002	E						
95998	5.0-5.6	native	99A7799-001.002	E						
97698	11.2-11.6	native	99A8275-003.002	E						

Appendix E  
Real VOC Data

Borehole	Sample Interval	Material	RIN/Event/Bottle	lab_result_qualifier_codes	2-CHLOROTOLUENE (ug/kg)	2-HEXANONE (ug/kg)	4-CHLOROTOLUENE (ug/kg)	4-ISOPROPYLTOLUENE (ug/kg)	4-METHYL-2-PENTANONE (ug/kg)	ACETONE (ug/kg)
97698	13.5-13.9	native	99A8275-004.002	E						
97698	16.3-16.7	native	99A8275-005.002	E						
97698	18.2-18.8	native	99A8275-008.002	E						
90998	3.8-4.0	native	98A2015-001.010	J						
95998	12.4-12.8	native	99A7799-003.002	J						
95998	17.7-18.2	native	99A7799-005.002	J						
95998	24.6-25.0	bedrock	99A7799-006.002	J			0.64			
95998	5.0-5.6	native	99A7799-001.002	J						
96198	4.4-4.7	native	99A3210-003.013	J						
96398	12.4-12.7	native	99A4102-001.009	J						
96398	16.2-16.4	bedrock	99A4102-001.012	J						1200
96398	4.3-4.8	native	99A4102-001.003	J						1600
96398	8.4-8.9	native	99A4102-001.006	J						3300
96498	4.8-5.2	native	99A3210-001.013	J						1700
96598	11.6-12.0	native	99A6817-003.002	J						
96598	22.3-22.7	bedrock	99A6817-006.002	J		2.9				
96598	8.4-8.8	native	99A6817-002.002	J						
96698	12.4-12.8	native	99A6649-003.002	J						
96698	17.7-18.3	native	99A7930-001.002	J						
96698	20.2-20.6	native	99A7930-002.002	J						
96698	22.4-22.8	bedrock	99A7930-003.002	J						
96798	12.5-12.9	native	99A6650-003.002	J						
96798	16.0-16.4	native	99A6650-004.002	J						
96798	20.4-20.8	native	99A6650-005.002	J						
96798	8.4-8.8	native	99A6650-002.002	J						
96898	17.1-17.4	bedrock	99A6307-004.002	J						
96998	4.4-4.8	native	99A6824-001.002	J						
96998	8.4-8.8	native	99A6824-002.002	J						
97098	4.2-4.7	native	99A6308-001.003	J						2.9
97098	8.4-8.8	native	99A6308-002.003	J						
97198	12.4-12.8	native	99A4102-002.009	J						
97198	15.5-16.1	native	99A4102-002.012	J						
97198	4.4-4.8	native	99A4102-002.006	J						
97198	7.3-7.6	native	99A4102-002.003	J						
97298	12.4-12.8	native	99A6825-003.002	J						
97298	4.0-4.4	native	99A6825-001.002	J						
97298	8.4-8.8	native	99A6825-002.002	J						
97698	11.2-11.6	native	99A8275-003.002	J						
97698	13.5-13.9	native	99A8275-004.002	J						
97698	16.3-16.7	native	99A8275-005.002	J						
97698	18.2-18.8	native	99A8275-008.002	J						
97698	19.4-19.8	native	99A8275-009.002	J						11.8
97698	8.2-8.6	native	99A8275-002.002	J						



Appendix E  
Real VOC Data

Borehole	Sample Interval	Material	RIN/Event/Bottle	lab_result_qualifier_codes	2-CHLOROTOLUENE (ug/kg)	2-HEXANONE (ug/kg)	4-CHLOROTOLUENE (ug/kg)	4-ISOPROPYLTOLUENE (ug/kg)	4-METHYL-2-PENTANONE (ug/kg)	ACETONE (ug/kg)
91198	11.6-11.9	native	98A1091-001.035	JB						440
91198	15.5-15.8	native	98A1091-001.036	JB						600
91198	3.1-3.4	native	98A1091-001.033	JB						1200
91198	7.7-8.0	native	98A1091-001.034	JB						810
92598	12.0-12.5	native	98A1092-001.035	JB						
92598	16.0-16.75	bedrock	98A1092-001.036	JB						
96598	22.3-22.7	bedrock	99A6817-006.002	JB						29.8
96698	12.4-12.8	native	99A6649-003.002	JB						2.5
96698	4.2-4.6	native	99A6649-001.002	JB						3.5
96698	8.2-8.6	native	99A6649-002.002	JB						3.2
96798	12.5-12.9	native	99A6650-003.002	JB						3
96798	16.0-16.4	native	99A6650-004.002	JB						2.9
96798	20.4-20.8	native	99A6650-005.002	JB						6.3
96798	4.4-4.8	native	99A6650-001.002	JB						11
96798	8.4-8.8	native	99A6650-002.002	JB						3.2
96898	12.3-12.6	native	99A6307-003.002	JB						
96898	17.1-17.4	bedrock	99A6307-004.002	JB						
96898	4.4-4.7	native	99A6307-001.002	JB						
96898	8.4-8.7	native	99A6307-002.002	JB						
96998	12.4-12.7	native	99A6824-003.002	JB						11.8
96998	17.2-17.8	bedrock	99A6824-004.002	JB						11.8
96998	4.4-4.8	native	99A6824-001.002	JB						2.5
96998	8.4-8.8	native	99A6824-002.002	JB						1.8
97098	16.5-17.0	bedrock	99A6308-004.003	JB						
97298	16.4-17.0	native	99A6825-004.002	JB						3.2
97298	17.7-18.2	bedrock	99A6825-005.002	JB						4.3
97698	19.4-19.8	native	99A8275-009.002	JB						
90998	3.8-4.0	native	98A2015-001.010	U	790	1600	790	790	1600	1600
91198	11.6-11.9	native	98A1091-001.035	U	690	1400	690	690	1400	
91198	15.5-15.8	native	98A1091-001.036	U	680	1400	680	680	1400	
91198	19.1-19.5	native	98A1091-001.037	U	630	1300	630	630	1300	1300
91198	19.5-19.8	bedrock	98A1091-001.038	U	620	1200	620	620	1200	1200
91198	3.1-3.4	native	98A1091-001.033	U	710	1400	710	710	1400	
91198	7.7-8.0	native	98A1091-001.034	U	680	1400	680	680	1400	
92598	12.0-12.5	native	98A1092-001.035	U	700	1400	700	700	1400	1400
92598	16.0-16.75	bedrock	98A1092-001.036	U	720	1400	720	720	1400	1400
92598	3.5-4.0	native	98A1092-001.033	U	650	1300	650	650	1300	1300
92598	7.5-8.0	native	98A1092-001.034	U	610	1200	610	610	1200	1200
95998	12.4-12.8	native	99A7799-003.002	U	58	58.1	5.8	5.8	58.1	116
95998	14.8-15.2	native	99A7799-004.002	U	5.3	53.2	5.3	5.3	53.2	106
95998	17.7-18.2	native	99A7799-005.002	U	5.6	55.6	5.6	5.6	55.6	111
95998	24.6-25.0	bedrock	99A7799-006.002	U	6.3	63.3	6.3	6.3	63.3	126
95998	5.0-5.6	native	99A7799-001.002	U	5.6	55.6	5.6	5.6	55.6	111



Appendix E  
Real VOC Data

Borehole	Sample Interval	Material	RIN/Event/Bottle	lab_result_qualifier_codes	2-CHLOROTOLUENE (ug/kg)	2-HEXANONE (ug/kg)	4-CHLOROTOLUENE (ug/kg)	4-ISOPROPYLTOLUENE (ug/kg)	4-METHYL-2-PENTANONE (ug/kg)	ACETONE (ug/kg)
95998 8.4-8.8		native	99A7799-002.002	U	5.2	51.5	5.2	5.2	51.5	103
96098 12.5-13.0		native	99A3210-002.015	U	700	700	700	700	700	
96098 16.0-16.2		bedrock	99A3210-002.016	U	700	700	700	700	700	
96098 4.5-4.8		native	99A3210-002.013	U	730	730	730	730	730	
96098 8.5-8.8		native	99A3210-002.014	U	690	690	690	690	690	
96198 12.0-12.5		native	99A3210-003.015	U	760	760	760	760	760	760
96198 15.8-16.2		bedrock	99A3210-003.016	U	700	700	700	700	700	700
96198 4.4-4.7		native	99A3210-003.013	U	670	670	670	670	670	670
96198 8.1-8.5		native	99A3210-003.014	U	750	750	750	750	750	750
96298 12.25-12.75		native	99A3210-004.016	U	720	720	720	720	720	720
96298 16.1-16.5		bedrock	99A3210-004.017	U	700	700	700	700	700	700
96298 4.3-4.7		native	99A3210-004.013	U	670	670	670	670	670	670
96298 8.0-9.0		native	99A3210-004.014	U	710	710	710	710	710	710
96398 12.4-12.7		native	99A4102-001.009	U	730	730	730	730	730	
96398 16.2-16.4		bedrock	99A4102-001.012	U	700	700	700	700	700	
96398 4.3-4.8		native	99A4102-001.003	U	710	710	710	710	710	
96398 8.4-8.9		native	99A4102-001.006	U	1300	1300				1300
96498 13-13.5		native	99A3210-001.015	U	60.2	60.2	6	6	60.2	120
96498 16.0-16.5		native	99A3210-001.016	U	53.2	53.2	5.3	5.3	53.2	106
96498 18.0-18.6		native	99A3210-001.017	U	62.5	62.5	6.2	6.2	62.5	
96498 22.0-22.5		bedrock	99A3210-001.018	U	56.8	56.8	5.7	5.7	56.8	114
96498 4.8-5.2		native	99A3210-001.013	U	5.3	5.3	5.3	5.3	5.3	105
96498 9.5-10.0		native	99A3210-001.014	U	5.9	59.3	5.9	5.9	59.3	
96598 11.6-12.0		native	99A6817-003.002	U	5.6	55.6	5.6	5.6	55.6	111
96598 15.2-15.6		native	99A6817-004.002	U	5.4	53.8	5.4	5.4	53.8	108
96598 18.6-18.9		native	99A6817-005.002	U	6.2	62.5	6.2	6.2	62.5	
96598 22.3-22.7		bedrock	99A6817-006.002	U	5.7	56.8	5.7	5.7	56.8	114
96598 4.2-4.6		native	99A6817-001.002	U	5.3	5.3	5.3	5.3	5.3	105
96598 8.4-8.8		native	99A6817-002.002	U	5.9	59.3	5.9	5.9	59.3	
96698 12.4-12.8		native	99A6649-003.002	U	5.6	55.6	5.6	5.6	55.6	111
96698 17.7-18.3		native	99A7930-001.002	U	5.4	53.8	5.4	5.4	53.8	108
96698 20.2-20.6		native	99A7930-002.002	U	6.4	64.1	6.4	6.4	64.1	128
96698 22.4-22.8		bedrock	99A7930-003.002	U	5.7	56.9	5.7	5.7	56.9	
96698 4.2-4.6		native	99A6649-001.002	U	5.6	55.6	5.6	5.6	55.6	
96698 8.2-8.6		native	99A6649-002.002	U	6.2	61.8	6.2	6.2	61.8	
96798 12.5-12.9		native	99A6650-003.002	U	7.2	71.9	7.2	7.2	71.9	
96798 16.0-16.4		native	99A6650-004.002	U	7.4	74.5	7.4	7.4	74.5	
96798 20.4-20.8		native	99A6650-005.002	U	5.3	52.8	5.3	5.3	52.8	
96798 4.4-4.8		native	99A6650-001.002	U	6.3	63.2	6.3	6.3	63.2	
96798 8.4-8.8		native	99A6650-002.002	U	6.4	64.1	6.4	6.4	64.1	128
96898 12.3-12.6		native	99A6307-003.002	U	5.3	52.6	5.3	5.3	52.6	105
96898 17.1-17.4		bedrock	99A6307-004.002	U	5.2	51.5	5.2	5.2	51.5	103
96898 4.4-4.7		native	99A6307-001.002	U	5.2	51.5	5.2	5.2	51.5	

Appendix E  
Real VOC Data

Borehole	Sample Interval	Material	RIN/Event/Bottle	lab_result_qualifier_codes	2-CHLOROTOLUENE (ug/kg)	2-HEXANONE (ug/kg)	4-CHLOROTOLUENE (ug/kg)	4-ISOPROPYLTOLUENE (ug/kg)	4-METHYL-2-PENTANONE (ug/kg)	ACETONE (ug/kg)
96898 8.4-8.7		native	99A6307-002.002	U	5.2	51.5	5.2	5.2	51.5	103
96998 12.4-12.7		native	99A6824-003.002	U	5.6	56.6	5.6	5.6	56.6	
96998 17.2-17.8		bedrock	99A6824-004.002	U	5.7	57.1	5.7	5.7	57.1	
96998 4.4-4.8		native	99A6824-001.002	U	5.3	53.1	5.3	5.3	53.1	
96998 8.4-8.8		native	99A6824-002.002	U	5.2	52.5	5.2	5.2	52.5	
97098 12.4-12.6		native	99A6308-003.003	U	5.1	51	5.1	5.1	51	102
97098 16.5-17.0		bedrock	99A6308-004.003	U	5.7	56.8	5.7	5.7	56.8	114
97098 4.2-4.7		native	99A6308-001.003	U	5.5	54.9	5.5	5.5	54.9	
97098 8.4-8.8		native	99A6308-002.003	U	5.8	58.1	5.8	5.8	58.1	116
97198 12.4-12.8		native	99A4102-002.009	U	650	650	650	650	650	
97198 15.5-16.1		native	99A4102-002.012	U	740	740	740	740	740	
97198 20.4-20.8		native	99A4102-002.015	U	670	670	670	670	670	84000
97198 24.4-24.8		bedrock	99A4102-002.018	U	700	700	700	700	700	700
97198 4.4-4.8		native	99A4102-002.006	U	700	700	700	700	700	
97198 7.3-7.6		native	99A4102-002.003	U	650	650	650	650	650	
97298 12.4-12.8		native	99A6825-003.002	U	5.3	53.2	5.3	5.3	53.2	106
97298 16.4-17.0		native	99A6825-004.002	U	5.4	53.5	5.4	5.4	53.5	
97298 17.7-18.2		bedrock	99A6825-005.002	U	6.1	61	6.1	6.1	61	
97298 4.0-4.4		native	99A6825-001.002	U	5.4	54.3	5.4	5.4	54.3	109
97298 8.4-8.8		native	99A6825-002.002	U	5.7	56.8	5.7	5.7	56.8	114
97698 11.2-11.6		native	99A8275-003.002	U	5.2	52.1	5.2	5.2	52.1	
97698 13.5-13.9		native	99A8275-004.002	U	5.4	54.3	5.4	5.4	54.3	
97698 16.3-16.7		native	99A8275-005.002	U	5.3	52.6	5.3	5.3	52.6	
97698 18.2-18.8		native	99A8275-008.002	U	5.6	55.6	5.6	5.6	55.6	
97698 19.4-19.8		native	99A8275-009.002	U	5.7	57.2	5.7	5.7	57.2	
97698 4.6-5.8		native	99A8275-001.002	U	5.3	53.2	5.3	5.3	53.2	106
97698 8.2-8.6		native	99A8275-002.002	U	5.3	52.6	5.3	5.3	52.6	105

Appendix E  
Real VOC Data

Borehole	Sample Interval	Material	RIN/Event/Bottle	lab_result_qualifier_codes	BENZENE (ug/kg)	BROMOBENZENE (ug/kg)	BROMOCHLOROMETHANE (ug/kg)	BROMODICHLOROMETHANE	BROMOFLUOROBENZENE (ug/kg)
90998	3.8-4.0	native	98A2015-001.010						86
91198	11.6-11.9	native	98A1091-001.035						114
91198	15.5-15.8	native	98A1091-001.036						107
91198	19.1-19.5	native	98A1091-001.037						87
91198	19.5-19.8	bedrock	98A1091-001.038						89
91198	3.1-3.4	native	98A1091-001.033						110
91198	7.7-8.0	native	98A1091-001.034						108
92598	12.0-12.5	native	98A1092-001.035						96
92598	16.0-16.75	bedrock	98A1092-001.036						96
92598	3.5-4.0	native	98A1092-001.033						88
92598	7.5-8.0	native	98A1092-001.034						95
95998	12.4-12.8	native	99A7799-003.002						56.6
95998	14.8-15.2	native	99A7799-004.002						51.1
95998	17.7-18.2	native	99A7799-005.002						54.7
95998	24.6-25.0	bedrock	99A7799-006.002						59.2
95998	5.0-5.6	native	99A7799-001.002						54
95998	8.4-8.8	native	99A7799-002.002						47.7
96298	16.1-16.5	bedrock	99A3210-004.017						99
96498	13.13.5	native	99A3210-001.015						100
96498	16.0-16.5	native	99A3210-001.016						100
96498	18.0-18.6	native	99A3210-001.017						98
96498	22.0-22.5	bedrock	99A3210-001.018						103
96498	4.8-5.2	native	99A3210-001.013						101
96498	9.5-10.0	native	99A3210-001.014						99
96598	11.6-12.0	native	99A6817-003.002						48.8
96598	15.2-15.6	native	99A6817-004.002						55.7
96598	18.6-18.9	native	99A6817-005.002						49
96598	22.3-22.7	bedrock	99A6817-006.002						50
96598	4.2-4.6	native	99A6817-001.002						51
96598	8.4-8.8	native	99A6817-002.002						48.1
96698	12.4-12.8	native	99A6649-003.002						54.3
96698	17.7-18.3	native	99A7930-001.002						54.7
96698	20.2-20.6	native	99A7930-002.002						51.8
96698	22.4-22.8	bedrock	99A7930-003.002						63.5
96698	4.2-4.6	native	99A6649-001.002						52.1
96698	8.2-8.6	native	99A6649-002.002						49.5
96798	12.5-12.9	native	99A6650-003.002						55.5
96798	16.0-16.4	native	99A6650-004.002						66.8
96798	20.4-20.8	native	99A6650-005.002						72.8
96798	8.4-8.8	native	99A6650-002.002						57.3
96898	12.3-12.6	native	99A6307-003.002						60
96898	17.1-17.4	bedrock	99A6307-004.002						48
96898	4.4-4.7	native	99A6307-001.002						47.7

Appendix E  
Real VOC Data

Borehole	Sample Interval	Material	RIN/Event/Bottle	lab_result_qualifier_codes	BENZENE (ug/kg)	BROMOBENZENE (ug/kg)	BROMOCHLOROMETHANE (ug/kg)	BROMODICHLOROMETHANE	BROMOFLUOROBENZENE (ug/kg)
96998	8.4-8.7	native	99A6307-002.002						47.7
96998	4.4-4.8	native	99A6824-001.002						45.9
96998	8.4-8.8	native	99A6824-002.002						44.6
97198	20.4-20.8	native	99A4102-002.015						91.25
97198	24.4-24.8	bedrock	99A4102-002.018						100.4
97298	12.4-12.8	native	99A6825-003.002						49.3
97298	16.4-17.0	native	99A6825-004.002						53.2
97298	17.7-18.2	bedrock	99A6825-005.002						57.9
97298	4.0-4.4	native	99A6825-001.002						49
97298	8.4-8.8	native	99A6825-002.002						51.3
97698	11.2-11.6	native	99A8275-003.002						49.5
97698	13.5-13.9	native	99A8275-004.002						53.9
97698	16.3-16.7	native	99A8275-005.002						49.9
97698	18.2-18.8	native	99A8275-008.002						52.5
97698	19.4-19.8	native	99A8275-009.002						52.2
97698	4.6-5.8	native	99A8275-001.002						49.9
97698	8.2-8.6	native	99A8275-002.002						51
90998	3.8-4.0	native	98A2015-001.010	B					
91198	11.6-11.9	native	98A1091-001.035	B					
91198	15.5-15.8	native	98A1091-001.036	B					
91198	19.1-19.5	native	98A1091-001.037	B					
91198	19.5-19.8	bedrock	98A1091-001.038	B					
91198	7.7-8.0	native	98A1091-001.034	B					
92598	12.0-12.5	native	98A1092-001.035	B					
92598	16.0-16.75	bedrock	98A1092-001.036	B					
92598	3.5-4.0	native	98A1092-001.033	B					
92598	7.5-8.0	native	98A1092-001.034	B					
97698	11.2-11.6	native	99A8275-003.002	B					
97698	13.5-13.9	native	99A8275-004.002	B					
97698	16.3-16.7	native	99A8275-005.002	B					
97698	18.2-18.8	native	99A8275-008.002	B					
95998	24.6-25.0	bedrock	99A7799-006.002	BJ					
96598	15.2-15.6	native	99A6817-004.002	BJ					
97198	24.4-24.8	bedrock	99A4102-002.018	BJ					
97698	11.2-11.6	native	99A8275-003.002	BJ					
97698	13.5-13.9	native	99A8275-004.002	BJ					
97698	16.3-16.7	native	99A8275-005.002	BJ					
97698	18.2-18.8	native	99A8275-008.002	BJ					
97698	4.6-5.8	native	99A8275-001.002	BJ					
97698	8.2-8.6	native	99A8275-002.002	BJ					
95998	24.6-25.0	bedrock	99A7799-006.002	E					
95998	5.0-5.6	native	99A7799-001.002	E					
97698	11.2-11.6	native	99A8275-003.002	E					

Appendix E  
Real VOC Data

Borehole	Sample Interval	Material	RIN/Event/Bottle	lab_result_qualifier_codes	BENZENE (ug/kg)	BROMOBENZENE (ug/kg)	BROMOCHLOROMETHANE (ug/kg)	BROMODICHLOROMETHANE	BROMOFLUOROBENZENE (ug/kg)
97698	13.5-13.9	native	99A8275-004.002	E					
97698	16.3-16.7	native	99A8275-005.002	E					
97698	18.2-18.8	native	99A8275-008.002	E					
90998	3.8-4.0	native	98A2015-001.010	J					
95998	12.4-12.8	native	99A7799-003.002	J					
95998	17.7-18.2	native	99A7799-005.002	J					
95998	24.6-25.0	bedrock	99A7799-006.002	J					
95998	5.0-5.6	native	99A7799-001.002	J					
96198	4.4-4.7	native	99A3210-003.013	J					
96398	12.4-12.7	native	99A4102-001.009	J					
96398	16.2-16.4	bedrock	99A4102-001.012	J					
96398	4.3-4.8	native	99A4102-001.003	J					
96398	8.4-8.9	native	99A4102-001.006	J					
96498	4.8-5.2	native	99A3210-001.013	J					
96598	11.6-12.0	native	99A6817-003.002	J					
96598	22.3-22.7	bedrock	99A6817-006.002	J					
96598	8.4-8.8	native	99A6817-002.002	J					
96698	12.4-12.8	native	99A6649-003.002	J					
96698	17.7-18.3	native	99A7930-001.002	J					
96698	20.2-20.6	native	99A7930-002.002	J					
96698	22.4-22.8	bedrock	99A7930-003.002	J					
96798	12.5-12.9	native	99A6650-003.002	J					
96798	16.0-16.4	native	99A6650-004.002	J					
96798	20.4-20.8	native	99A6650-005.002	J					
96798	8.4-8.8	native	99A6650-002.002	J					
96898	17.1-17.4	bedrock	99A6307-004.002	J					
96998	4.4-4.8	native	99A6824-001.002	J					
96998	8.4-8.8	native	99A6824-002.002	J					
97098	4.2-4.7	native	99A6308-001.003	J					
97098	8.4-8.8	native	99A6308-002.003	J					
97198	12.4-12.8	native	99A4102-002.009	J					
97198	15.5-16.1	native	99A4102-002.012	J					
97198	4.4-4.8	native	99A4102-002.006	J					
97198	7.3-7.6	native	99A4102-002.003	J					
97298	12.4-12.8	native	99A6825-003.002	J					
97298	4.0-4.4	native	99A6825-001.002	J					
97298	8.4-8.8	native	99A6825-002.002	J					
97698	11.2-11.6	native	99A8275-003.002	J					
97698	13.5-13.9	native	99A8275-004.002	J					
97698	16.3-16.7	native	99A8275-005.002	J					
97698	18.2-18.8	native	99A8275-008.002	J					
97698	19.4-19.8	native	99A8275-009.002	J					
97698	8.2-8.6	native	99A8275-002.002	J					

Appendix E  
Real VOC Data

Borehole	Sample Interval	Material	RIN/Event/Bottle	lab_result_qualifier_codes	BENZENE (ug/kg)	BROMOBENZENE (ug/kg)	BROMOCHLOROMETHANE (ug/kg)	BROMODICHLOROMETHANE	BROMOFLUOROBENZENE (ug/kg)
91198	11.6-11.9	native	98A1091-001.035	JB					
91198	15.5-15.8	native	98A1091-001.036	JB					
91198	3.1-3.4	native	98A1091-001.033	JB					
91198	7.7-8.0	native	98A1091-001.034	JB					
92598	12.0-12.5	native	98A1092-001.035	JB					
92598	16.0-16.75	bedrock	98A1092-001.036	JB					
96598	22.3-22.7	bedrock	99A6817-006.002	JB					
96698	12.4-12.8	native	99A6649-003.002	JB					
96698	4.2-4.6	native	99A6649-001.002	JB					
96698	8.2-8.6	native	99A6649-002.002	JB					
96798	12.5-12.9	native	99A6650-003.002	JB					
96798	16.0-16.4	native	99A6650-004.002	JB					
96798	20.4-20.8	native	99A6650-005.002	JB					
96798	4.4-4.8	native	99A6650-001.002	JB					
96798	8.4-8.8	native	99A6650-002.002	JB					
96898	12.3-12.6	native	99A6307-003.002	JB					
96898	17.1-17.4	bedrock	99A6307-004.002	JB					
96898	4.4-4.7	native	99A6307-001.002	JB					
96898	8.4-8.7	native	99A6307-002.002	JB					
96998	12.4-12.7	native	99A6824-003.002	JB					
96998	17.2-17.8	bedrock	99A6824-004.002	JB					
96998	4.4-4.8	native	99A6824-001.002	JB					
96998	8.4-8.8	native	99A6824-002.002	JB					
97098	16.5-17.0	bedrock	99A6308-004.003	JB					
97298	16.4-17.0	native	99A6825-004.002	JB					
97298	17.7-18.2	bedrock	99A6825-005.002	JB					
97698	19.4-19.8	native	99A8275-009.002	JB					
90998	3.8-4.0	native	98A2015-001.010	U	790	790	790	790	790
91198	11.6-11.9	native	98A1091-001.035	U	690	690	690	690	690
91198	15.5-15.8	native	98A1091-001.036	U	680	680	680	680	680
91198	19.1-19.5	native	98A1091-001.037	U	630	630	630	630	630
91198	19.5-19.8	bedrock	98A1091-001.038	U	620	620	620	620	620
91198	3.1-3.4	native	98A1091-001.033	U	710	710	710	710	710
91198	7.7-8.0	native	98A1091-001.034	U	680	680	680	680	680
92598	12.0-12.5	native	98A1092-001.035	U	700	700	700	700	700
92598	16.0-16.75	bedrock	98A1092-001.036	U	720	720	720	720	720
92598	3.5-4.0	native	98A1092-001.033	U	650	650	650	650	650
92598	7.5-8.0	native	98A1092-001.034	U	610	610	610	610	610
95998	12.4-12.8	native	99A7799-003.002	U	58	58	58	58	58
95998	14.8-15.2	native	99A7799-004.002	U	53	53	53	53	53
95998	17.7-18.2	native	99A7799-005.002	U	56	56	56	56	56
95998	24.6-25.0	bedrock	99A7799-006.002	U	63	63	63	63	63
95998	5.0-5.6	native	99A7799-001.002	U	56	56	56	56	56

Appendix E  
Real VOC Data

Borehole	Sample Interval	Material	RIN/Event/Bottle	lab_result_qualifier_codes	BENZENE (ug/kg)	BROMOBENZENE (ug/kg)	BROMOCHLOROMETHANE (ug/kg)	BROMODICHLOROMETHANE	BROMOFLUOROBENZENE (ug/kg)
95998	8.4-8.8	native	99A7799-002.002	U	5.2	5.2	5.2		
96098	12.5-13.0	native	99A3210-002.015	U	700	700	700	700	
96098	16.0-16.2	bedrock	99A3210-002.016	U	700	700	700	700	
96098	4.5-4.8	native	99A3210-002.013	U	730	730	730	730	
96098	8.5-8.8	native	99A3210-002.014	U	690	690	690	690	
96198	12.0-12.5	native	99A3210-003.015	U	760	760	760	760	
96198	15.8-16.2	bedrock	99A3210-003.016	U	700	700	700	700	
96198	4.4-4.7	native	99A3210-003.013	U	700	700	700	700	
96198	8.1-8.5	native	99A3210-003.014	U	670	670	670	670	
96298	12.25-12.75	native	99A3210-004.016	U	750	750	750	750	
96298	16.1-16.5	bedrock	99A3210-004.017	U	720	720	720	720	
96298	4.3-4.7	native	99A3210-004.013	U	700	700	700	700	
96298	8.0-9.0	native	99A3210-004.014	U	670	670	670	670	
96398	12.4-12.7	native	99A4102-001.009	U	710	710	710	710	
96398	16.2-16.4	bedrock	99A4102-001.012	U	730	730	730	730	
96398	4.3-4.8	native	99A4102-001.003	U	700	700	700	700	
96398	8.4-8.9	native	99A4102-001.006	U	710	710	710	710	
96498	13-13.5	native	99A3210-001.015	U	1300			1300	
96498	16.0-16.5	native	99A3210-001.016	U	1300			1300	
96498	18.0-18.6	native	99A3210-001.017	U	1300			1300	
96498	22.0-22.5	bedrock	99A3210-001.018	U	1500			1500	
96498	4.8-5.2	native	99A3210-001.013	U	1500			1500	
96498	9.5-10.0	native	99A3210-001.014	U	1300			1300	
96598	11.6-12.0	native	99A6817-003.002	U	5.4	5.4	5.4		
96598	15.2-15.6	native	99A6817-004.002	U	6	6	6		
96598	18.6-18.9	native	99A6817-005.002	U	5.3	5.3	5.3		
96598	22.3-22.7	bedrock	99A6817-006.002	U	6.2	6.2	6.2		
96598	4.2-4.6	native	99A6817-001.002	U	5.7	5.7	5.7		
96598	8.4-8.8	native	99A6817-002.002	U	5.3	5.3	5.3		
96698	12.4-12.8	native	99A6649-003.002	U	5.9	5.9	5.9		
96698	17.7-18.3	native	99A7930-001.002	U	5.6	5.6	5.6		
96698	20.2-20.6	native	99A7930-002.002	U	5.4	5.4	5.4		
96698	22.4-22.8	bedrock	99A7930-003.002	U	6.4	6.4	6.4		
96698	4.2-4.6	native	99A6649-001.002	U	5.7	5.7	5.7		
96698	8.2-8.6	native	99A6649-002.002	U	5.6	5.6	5.6		
96798	12.5-12.9	native	99A6650-003.002	U	6.2	6.2	6.2		
96798	16.0-16.4	native	99A6650-004.002	U	7.2	7.2	7.2		
96798	20.4-20.8	native	99A6650-005.002	U	7.4	7.4	7.4		
96798	4.4-4.8	native	99A6650-001.002	U	5.3	5.3	5.3		
96798	8.4-8.8	native	99A6650-002.002	U	6.3	6.3	6.3		
96898	12.3-12.6	native	99A6307-003.002	U	6.4	6.4	6.4		
96898	17.1-17.4	bedrock	99A6307-004.002	U	5.3	5.3	5.3		
96898	4.4-4.7	native	99A6307-001.002	U	5.2	5.2	5.2		



Appendix E  
Real VOC Data

Borehole	Sample Interval	Material	RIN/Event/Bottle	lab_result_qualifier_codes	BENZENE (ug/kg)	BROMOBENZENE (ug/kg)	BROMOCHLOROMETHANE (ug/kg)	BROMODICHLOROMETHANE	BROMOFLUOROBENZENE (ug/kg)
96998	8.4-8.7	native	99A6307-002.002	U	5.2	5.2	5.2		
96998	12.4-12.7	native	99A6824-003.002	U	5.6	5.6	5.6		
96998	17.2-17.8	bedrock	99A6824-004.002	U	5.7	5.7	5.7		
96998	4.4-4.8	native	99A6824-001.002	U	5.3	5.3	5.3		
96998	8.4-8.8	native	99A6824-002.002	U	5.2	5.2	5.2		
97098	12.4-12.6	native	99A6308-003.003	U	5.1	5.1	5.1		
97098	16.5-17.0	bedrock	99A6308-004.003	U	5.7	5.7	5.7		
97098	4.2-4.7	native	99A6308-001.003	U	5.5	5.5	5.5		
97098	8.4-8.8	native	99A6308-002.003	U	5.8	5.8	5.8		
97198	12.4-12.8	native	99A4102-002.009	U	650	650	650	650	
97198	15.5-16.1	native	99A4102-002.012	U	740	740	740	740	
97198	20.4-20.8	native	99A4102-002.015	U	670	670	670	670	
97198	24.4-24.8	bedrock	99A4102-002.018	U	700	700	700	700	
97198	4.4-4.8	native	99A4102-002.006	U	700	700	700	700	
97198	7.3-7.6	native	99A4102-002.003	U	650	650	650	650	
97298	12.4-12.8	native	99A6825-003.002	U	5.3	5.3	5.3		
97298	16.4-17.0	native	99A6825-004.002	U	5.4	5.4	5.4		
97298	17.7-18.2	bedrock	99A6825-005.002	U	6.1	6.1	6.1		
97298	4.0-4.4	native	99A6825-001.002	U	5.4	5.4	5.4		
97298	8.4-8.8	native	99A6825-002.002	U	5.7	5.7	5.7		
97698	11.2-11.6	native	99A8275-003.002	U	5.2	5.2	5.2		
97698	13.5-13.9	native	99A8275-004.002	U	5.4	5.4	5.4		
97698	16.3-16.7	native	99A8275-005.002	U	5.3	5.3	5.3		
97698	18.2-18.8	native	99A8275-008.002	U	5.6	5.6	5.6		
97698	19.4-19.8	native	99A8275-009.002	U	5.7	5.7	5.7		
97698	4.6-5.8	native	99A8275-001.002	U	5.3	5.3	5.3		
97698	8.2-8.6	native	99A8275-002.002	U	5.3	5.3	5.3		



Appendix E  
Real VOC Data

Borehole	Sample Interval	Material	RIN/Event/Bottle	lab_result_qualifier_codes	BROMOFORM (ug/kg)	BROMOMETHANE (ug/kg)	CARBON DISULFIDE (ug/kg)	CARBON TETRACHLORIDE (ug/kg)	CHLOROBENZENE (ug/kg)	CHLORODIBROMOMETHANE (ug/kg)
90998	3.8-4.0	native	98A2015-001.010							
91198	11.6-11.9	native	98A1091-001.035							
91198	15.5-15.8	native	98A1091-001.036							
91198	19.1-19.5	native	98A1091-001.037							
91198	19.5-19.8	bedrock	98A1091-001.038							
91198	3.1-3.4	native	98A1091-001.033							
91198	7.7-8.0	native	98A1091-001.034							
92598	12.0-12.5	native	98A1092-001.035							
92598	16.0-16.75	bedrock	98A1092-001.036							
92598	3.5-4.0	native	98A1092-001.033							
92598	7.5-8.0	native	98A1092-001.034							
95998	12.4-12.8	native	99A7799-003.002							
95998	14.8-15.2	native	99A7799-004.002							
95998	17.7-18.2	native	99A7799-005.002							
95998	24.6-25.0	bedrock	99A7799-006.002							
95998	5.0-5.6	native	99A7799-001.002							
95998	8.4-8.8	native	99A7799-002.002							
96298	16.1-16.5	bedrock	99A3210-004.017							
96498	13-13.5	native	99A3210-001.015							
96498	16.0-16.5	native	99A3210-001.016							
96498	18.0-18.6	native	99A3210-001.017							
96498	22.0-22.5	bedrock	99A3210-001.018							
96498	4.8-5.2	native	99A3210-001.013							
96498	9.5-10.0	native	99A3210-001.014							
96598	11.6-12.0	native	99A6817-003.002							
96598	15.2-15.6	native	99A6817-004.002							
96598	18.6-18.9	native	99A6817-005.002							
96598	22.3-22.7	bedrock	99A6817-006.002							
96598	4.2-4.6	native	99A6817-001.002							
96598	8.4-8.8	native	99A6817-002.002							
96698	12.4-12.8	native	99A6649-003.002							
96698	17.7-18.3	native	99A7930-001.002							
96698	20.2-20.6	native	99A7930-002.002							
96698	22.4-22.8	bedrock	99A7930-003.002							
96698	4.2-4.6	native	99A6649-001.002							
96698	8.2-8.6	native	99A6649-002.002							
96798	12.5-12.9	native	99A6650-003.002							
96798	16.0-16.4	native	99A6650-004.002							
96798	20.4-20.8	native	99A6650-005.002							
96798	8.4-8.8	native	99A6650-002.002							
96898	12.3-12.6	native	99A6307-003.002							
96998	17.1-17.4	bedrock	99A6307-004.002							
96898	4.4-4.7	native	99A6307-001.002							

359

Appendix E  
Real VOC Data

Borehole	Sample Interval	Material	RIN/Event/Bottle	lab_result_qualifier_codes	BROMOFORM (ug/kg)	BROMOMETHANE (ug/kg)	CARBON DISULFIDE (ug/kg)	CARBON TETRACHLORIDE (ug/kg)	CHLOROBENZENE (ug/kg)	CHLORODIBROMOMETHANE (ug/kg)
96898	8.4-8.7	native	99A6307-002.002							
96998	4.4-4.8	native	99A6824-001.002							
96998	8.4-8.8	native	99A6824-002.002							
97198	20.4-20.8	native	99A4102-002.015							
97198	24.4-24.8	bedrock	99A4102-002.018							
97298	12.4-12.8	native	99A6825-003.002							
97298	16.4-17.0	native	99A6825-004.002							
97298	17.7-18.2	bedrock	99A6825-005.002							
97298	4.0-4.4	native	99A6825-001.002							
97298	8.4-8.8	native	99A6825-002.002							
97698	11.2-11.6	native	99A8275-003.002							
97698	13.5-13.9	native	99A8275-004.002							
97698	16.3-16.7	native	99A8275-005.002							
97698	18.2-18.8	native	99A8275-008.002							
97698	19.4-19.8	native	99A8275-009.002							
97698	4.6-5.8	native	99A8275-001.002							
97698	8.2-8.6	native	99A8275-002.002							
90998	3.8-4.0	native	98A2015-001.010	B						
91198	11.6-11.9	native	98A1091-001.035	B						
91198	15.5-15.8	native	98A1091-001.036	B						
91198	19.1-19.5	native	98A1091-001.037	B						
91198	19.5-19.8	bedrock	98A1091-001.038	B						
91198	7.7-8.0	native	98A1091-001.034	B						
92598	12.0-12.5	native	98A1092-001.035	B						
92598	16.0-16.75	bedrock	98A1092-001.036	B						
92598	3.5-4.0	native	98A1092-001.033	B						
92598	7.5-8.0	native	98A1092-001.034	B						
97698	11.2-11.6	native	99A8275-003.002	B						
97698	13.5-13.9	native	99A8275-004.002	B						
97698	16.3-16.7	native	99A8275-005.002	B						
97698	18.2-18.8	native	99A8275-008.002	B						
95998	24.6-25.0	bedrock	99A7799-006.002	BJ						
96598	15.2-15.6	native	99A6817-004.002	BJ						
97198	24.4-24.8	bedrock	99A4102-002.018	BJ						
97698	11.2-11.6	native	99A8275-003.002	BJ						
97698	13.5-13.9	native	99A8275-004.002	BJ						
97698	16.3-16.7	native	99A8275-005.002	BJ						
97698	18.2-18.8	native	99A8275-008.002	BJ						
97698	4.6-5.8	native	99A8275-001.002	BJ						
97698	8.2-8.6	native	99A8275-002.002	BJ						
95998	24.6-25.0	bedrock	99A7799-006.002	E						
95998	5.0-5.6	native	99A7799-001.002	E						
97698	11.2-11.6	native	99A8275-003.002	E						

Appendix E  
Real VOC Data

Borehole	Sample Interval	Material	RIN/Event/Bottle	lab_result_qualifier_codes	BROMOFORM (ug/kg)	BROMOMETHANE (ug/kg)	CARBON DISULFIDE (ug/kg)	CARBON TETRACHLORIDE (ug/kg)	CHLOROBENZENE (ug/kg)	CHLORODIBROMOMETHANE (ug/kg)
97698	13.5-13.9	native	99A8275-004.002	E						
97698	16.3-16.7	native	99A8275-005.002	E						
97698	18.2-18.8	native	99A8275-008.002	E						
90998	3.8-4.0	native	98A2015-001.010	J						
95998	12.4-12.8	native	99A7799-003.002	J						
95998	17.7-18.2	native	99A7799-005.002	J						
95998	24.6-25.0	bedrock	99A7799-006.002	J						
95998	5.0-5.6	native	99A7799-001.002	J						
96198	4.4-4.7	native	99A3210-003.013	J						
96398	12.4-12.7	native	99A4102-001.009	J						
96398	16.2-16.4	bedrock	99A4102-001.012	J						
96398	4.3-4.8	native	99A4102-001.003	J			160			
96398	8.4-8.9	native	99A4102-001.006	J			160			
96498	4.8-5.2	native	99A3210-001.013	J						
96598	11.6-12.0	native	99A6817-003.002	J						
96598	22.3-22.7	bedrock	99A6817-006.002	J						
96598	8.4-8.8	native	99A6817-002.002	J						
96698	12.4-12.8	native	99A6649-003.002	J						
96698	17.7-18.3	native	99A7930-001.002	J						
96698	20.2-20.6	native	99A7930-002.002	J						
96698	22.4-22.8	bedrock	99A7930-003.002	J				2.3		
96798	12.5-12.9	native	99A6650-003.002	J						
96798	16.0-16.4	native	99A6650-004.002	J						
96798	20.4-20.8	native	99A6650-005.002	J					5.3	
96798	8.4-8.8	native	99A6650-002.002	J						
96898	17.1-17.4	bedrock	99A6307-004.002	J						
96998	4.4-4.8	native	99A6824-001.002	J						
96998	8.4-8.8	native	99A6824-002.002	J						
97098	4.2-4.7	native	99A6308-001.003	J						
97098	8.4-8.8	native	99A6308-002.003	J						
97198	12.4-12.8	native	99A4102-002.009	J						
97198	15.5-16.1	native	99A4102-002.012	J						
97198	4.4-4.8	native	99A4102-002.006	J						
97198	7.3-7.6	native	99A4102-002.003	J						
97298	12.4-12.8	native	99A6825-003.002	J						
97298	4.0-4.4	native	99A6825-001.002	J						
97298	8.4-8.8	native	99A6825-002.002	J						
97698	11.2-11.6	native	99A8275-003.002	J						
97698	13.5-13.9	native	99A8275-004.002	J						
97698	16.3-16.7	native	99A8275-005.002	J						
97698	18.2-18.8	native	99A8275-008.002	J						
97698	19.4-19.8	native	99A8275-009.002	J						
97698	8.2-8.6	native	99A8275-002.002	J						

Appendix E  
Real VOC Data

Borehole	Sample Interval	Material	RIN/Event/Bottle	lab_result_qualifier_codes	BROMOFORM (ug/kg)	BROMOMETHANE (ug/kg)	CARBON DISULFIDE (ug/kg)	CARBON TETRACHLORIDE (ug/kg)	CHLOROBENZENE (ug/kg)	CHLORODIBROMOMETHANE (ug/kg)
91198	11.6-11.9	native	98A1091-001.035	JB						
91198	15.5-15.8	native	98A1091-001.036	JB						
91198	3.1-3.4	native	98A1091-001.033	JB		690				
91198	7.7-8.0	native	98A1091-001.034	JB						
92598	12.0-12.5	native	98A1092-001.035	JB						
92598	16.0-16.75	bedrock	98A1092-001.036	JB						
96598	22.3-22.7	bedrock	99A6817-006.002	JB						
96698	12.4-12.8	native	99A6649-003.002	JB						
96698	4.2-4.6	native	99A6649-001.002	JB						
96698	8.2-8.6	native	99A6649-002.002	JB						
96798	12.5-12.9	native	99A6650-003.002	JB						
96798	16.0-16.4	native	99A6650-004.002	JB						
96798	20.4-20.8	native	99A6650-005.002	JB						
96798	4.4-4.8	native	99A6650-001.002	JB						
96798	8.4-8.8	native	99A6650-002.002	JB						
96898	12.3-12.6	native	99A6307-003.002	JB						
96898	17.1-17.4	bedrock	99A6307-004.002	JB						
96898	4.4-4.7	native	99A6307-001.002	JB						
96898	8.4-8.7	native	99A6307-002.002	JB						
96998	12.4-12.7	native	99A6824-003.002	JB						
96998	17.2-17.8	bedrock	99A6824-004.002	JB						
96998	4.4-4.8	native	99A6824-001.002	JB						
96998	8.4-8.8	native	99A6824-002.002	JB						
97098	16.5-17.0	bedrock	99A6308-004.003	JB						
97298	16.4-17.0	native	99A6825-004.002	JB						
97298	17.7-18.2	bedrock	99A6825-005.002	JB						
97698	19.4-19.8	native	99A8275-009.002	JB						
90998	3.8-4.0	native	98A2015-001.010	U	790	1600	790	790	790	
91198	11.6-11.9	native	98A1091-001.035	U	690	1400	690	690	690	
91198	15.5-15.8	native	98A1091-001.036	U	680	1400	680	680	680	
91198	19.1-19.5	native	98A1091-001.037	U	630	1300	630	630	630	
91198	19.5-19.8	bedrock	98A1091-001.038	U	620	1200	620	620	620	
91198	3.1-3.4	native	98A1091-001.033	U	710		710	710	710	
91198	7.7-8.0	native	98A1091-001.034	U	680	1400	680	680	680	
92598	12.0-12.5	native	98A1092-001.035	U	700	1400	700	700	700	
92598	16.0-16.75	bedrock	98A1092-001.036	U	720	1400	720	720	720	
92598	3.5-4.0	native	98A1092-001.033	U	650	1300	650	650	650	
92598	7.5-8.0	native	98A1092-001.034	U	610	1200	610	610	610	
95998	12.4-12.8	native	99A7799-003.002	U	5.8		5.8	5.8	5.8	5.8
95998	14.8-15.2	native	99A7799-004.002	U	5.3		5.3	5.3	5.3	5.3
95998	17.7-18.2	native	99A7799-005.002	U	5.6		5.6	5.6	5.6	5.6
95998	24.6-25.0	bedrock	99A7799-006.002	U	6.3		6.3	6.3	6.3	6.3
95998	5.0-5.6	native	99A7799-001.002	U	5.6		5.6	5.6	5.6	5.6

Appendix E  
Real VOC Data

Borehole	Sample Interval	Material	RIN/Event/Bottle	lab_result_qualifier_codes	BROMOFORM (ug/kg)	BROMOMETHANE (ug/kg)	CARBON DISULFIDE (ug/kg)	CARBON TETRACHLORIDE (ug/kg)	CHLORO BENZENE (ug/kg)	CHLORODIBROMOMETHANE (ug/kg)
95998 8.4-8.8		native	99A7799-002.002	U	5.2		5.2	5.2	5.2	5.2
96098 12.5-13.0		native	99A3210-002.015	U	700	700	700	700	700	
96098 16.0-16.2		bedrock	99A3210-002.016	U	700	700	700	700	700	
96098 4.5-4.8		native	99A3210-002.013	U	730	730	730	730	730	
96098 8.5-8.8		native	99A3210-002.014	U	690	690	690	690	690	
96198 12.0-12.5		native	99A3210-003.015	U	760	760	760	760	760	
96198 15.8-16.2		bedrock	99A3210-003.016	U	700	700	700	700	700	
96198 4.4-4.7		native	99A3210-003.013	U	700	700	700	700	700	
96198 8.1-8.5		native	99A3210-003.014	U	670	670	670	670	670	
96298 12.25-12.75		native	99A3210-004.016	U	750	750	750	750	750	
96298 16.1-16.5		bedrock	99A3210-004.017	U	720	720	720	720	720	
96298 4.3-4.7		native	99A3210-004.013	U	700	700	700	700	700	
96298 8.0-9.0		native	99A3210-004.014	U	670	670	670	670	670	
96398 12.4-12.7		native	99A4102-001.009	U	710	710	710	710	710	
96398 16.2-16.4		bedrock	99A4102-001.012	U	730	730	730	730	730	
96398 4.3-4.8		native	99A4102-001.003	U	700	700		700	700	
96398 8.4-8.9		native	99A4102-001.006	U	710	710		710	710	
96498 13-13.5		native	99A3210-001.015	U	1300	1300	1300	1300	1300	
96498 16.0-16.5		native	99A3210-001.016	U	1300	1300	1300	1300	1300	
96498 18.0-18.6		native	99A3210-001.017	U	1300	1300	1300	1300	1300	
96498 22.0-22.5		bedrock	99A3210-001.018	U	1500	1500	1500	1500	1500	
96498 4.8-5.2		native	99A3210-001.013	U	1500	1500	1500	1500	1500	
96498 9.5-10.0		native	99A3210-001.014	U	1300	1300	1300	1300	1300	
96598 11.6-12.0		native	99A6817-003.002	U	5.4		5.4	5.4	5.4	5.4
96598 15.2-15.6		native	99A6817-004.002	U	6		6	6	6	6
96598 18.6-18.9		native	99A6817-005.002	U	5.3		5.3	5.3	5.3	5.3
96598 22.3-22.7		bedrock	99A6817-006.002	U	6.2		6.2	6.2	6.2	6.2
96598 4.2-4.6		native	99A6817-001.002	U	5.7		5.7	5.7	5.7	5.7
96598 8.4-8.8		native	99A6817-002.002	U	5.3		5.3	5.3	5.3	5.3
96698 12.4-12.8		native	99A6649-003.002	U	5.9		5.9	5.9	5.9	5.9
96698 17.7-18.3		native	99A7930-001.002	U	5.6		5.6	5.6	5.6	5.6
96698 20.2-20.6		native	99A7930-002.002	U	5.4		5.4	5.4	5.4	5.4
96698 22.4-22.8		bedrock	99A7930-003.002	U	6.4		6.4	6.4	6.4	6.4
96698 4.2-4.6		native	99A6649-001.002	U	5.7		5.7	5.7	5.7	5.7
96698 8.2-8.6		native	99A6649-002.002	U	5.6		5.6	5.6	5.6	5.6
96798 12.5-12.9		native	99A6650-003.002	U	6.2		6.2	6.2	6.2	6.2
96798 16.0-16.4		native	99A6650-004.002	U	7.2		7.2	7.2	7.2	7.2
96798 20.4-20.8		native	99A6650-005.002	U	7.4		7.4	7.4	7.4	7.4
96798 4.4-4.8		native	99A6650-001.002	U	5.3		5.3	5.3	5.3	5.3
96798 8.4-8.8		native	99A6650-002.002	U	6.3		6.3	6.3	6.3	6.3
96898 12.3-12.6		native	99A6307-003.002	U	6.4		6.4	6.4	6.4	6.4
96898 17.1-17.4		bedrock	99A6307-004.002	U	5.3		5.3	5.3	5.3	5.3
96898 4.4-4.7		native	99A6307-001.002	U	5.2		5.2	5.2	5.2	5.2

Appendix E  
Real VOC Data

Borehole	Sample Interval	Material	RIN/Event/Bottle	lab_result_qualifier_codes	BROMOFORM (ug/kg)	BROMOMETHANE (ug/kg)	CARBON DISULFIDE (ug/kg)	CARBON TETRACHLORIDE (ug/kg)	CHLOROBENZENE (ug/kg)	CHLORODIBROMOMETHANE (ug/kg)
96898	8.4-8.7	native	99A6307-002.002	U	5.2		5.2	5.2	5.2	5.2
96998	12.4-12.7	native	99A6824-003.002	U	5.6		5.6	5.6	5.6	5.6
96998	17.2-17.8	bedrock	99A6824-004.002	U	5.7		5.7	5.7	5.7	5.7
96998	4.4-4.8	native	99A6824-001.002	U	5.3		5.3	5.3	5.3	5.3
96998	8.4-8.8	native	99A6824-002.002	U	5.2		5.2	5.2	5.2	5.2
97098	12.4-12.6	native	99A6308-003.003	U	5.1		5.1	5.1	5.1	5.1
97098	16.5-17.0	bedrock	99A6308-004.003	U	5.7		5.7	5.7	5.7	5.7
97098	4.2-4.7	native	99A6308-001.003	U	5.5		5.5	5.5	5.5	5.5
97098	8.4-8.8	native	99A6308-002.003	U	5.8		5.8	5.8	5.8	5.8
97198	12.4-12.8	native	99A4102-002.009	U	650	650	650	650	650	650
97198	15.5-16.1	native	99A4102-002.012	U	740	740	740	740	740	740
97198	20.4-20.8	native	99A4102-002.015	U	670	670	670	670	670	670
97198	24.4-24.8	bedrock	99A4102-002.018	U	700	700	700	700	700	700
97198	4.4-4.8	native	99A4102-002.006	U	700	700	700	700	700	700
97198	7.3-7.6	native	99A4102-002.003	U	650	650	650	650	650	650
97298	12.4-12.8	native	99A6825-003.002	U	5.3		5.3	5.3	5.3	5.3
97298	16.4-17.0	native	99A6825-004.002	U	5.4		5.4	5.4	5.4	5.4
97298	17.7-18.2	bedrock	99A6825-005.002	U	6.1		6.1	6.1	6.1	6.1
97298	4.0-4.4	native	99A6825-001.002	U	5.4		5.4	5.4	5.4	5.4
97298	8.4-8.8	native	99A6825-002.002	U	5.7		5.7	5.7	5.7	5.7
97698	11.2-11.6	native	99A8275-003.002	U	5.2		5.2	5.2	5.2	5.2
97698	13.5-13.9	native	99A8275-004.002	U	5.4		5.4	5.4	5.4	5.4
97698	16.3-16.7	native	99A8275-005.002	U	5.3		5.3	5.3	5.3	5.3
97698	18.2-18.8	native	99A8275-008.002	U	5.6		5.6	5.6	5.6	5.6
97698	19.4-19.8	native	99A8275-009.002	U	5.7		5.7	5.7	5.7	5.7
97698	4.6-5.8	native	99A8275-001.002	U	5.3		5.3	5.3	5.3	5.3
97698	8.2-8.6	native	99A8275-002.002	U	5.3		5.3	5.3	5.3	5.3

Appendix E  
Real VOC Data

Borehole	Sample Interval	Material	RIN/Event/Bottle	lab_result_qualifier_codes	CHLOROETHANE (ug/kg)	CHLOROFORM (ug/kg)	Chloromethane (ug/kg)	CIS-1,2-DICHLOROETHENE (ug/kg)	CIS-1,3-DICHLOROPROPENE (ug/kg)	CIS-1,3-DICHLOROPROPYLENE (ug/kg)
90998	3.8-4.0	native	98A2015-001.010					4400		
91198	11.6-11.9	native	98A1091-001.035							
91198	15.5-15.8	native	98A1091-001.036							
91198	19.1-19.5	native	98A1091-001.037							
91198	19.5-19.8	bedrock	98A1091-001.038							
91198	3.1-3.4	native	98A1091-001.033							
91198	7.7-8.0	native	98A1091-001.034							
92598	12.0-12.5	native	98A1092-001.035							
92598	16.0-16.75	bedrock	98A1092-001.036							
92598	3.5-4.0	native	98A1092-001.033							
92598	7.5-8.0	native	98A1092-001.034							
95998	12.4-12.8	native	99A7799-003.002							
95998	14.8-15.2	native	99A7799-004.002							
95998	17.7-18.2	native	99A7799-005.002							
95998	24.6-25.0	bedrock	99A7799-006.002							
95998	5.0-5.6	native	99A7799-001.002							
95998	8.4-8.8	native	99A7799-002.002							
96298	16.1-16.5	bedrock	99A3210-004.017							
96498	13-13.5	native	99A3210-001.015							
96498	16.0-16.5	native	99A3210-001.016							
96498	18.0-18.6	native	99A3210-001.017							
96498	22.0-22.5	bedrock	99A3210-001.018							
96498	4.8-5.2	native	99A3210-001.013							
96498	9.5-10.0	native	99A3210-001.014							
96598	11.6-12.0	native	99A6817-003.002							
96598	15.2-15.6	native	99A6817-004.002							
96598	18.6-18.9	native	99A6817-005.002							
96598	22.3-22.7	bedrock	99A6817-006.002							
96598	4.2-4.6	native	99A6817-001.002							
96598	8.4-8.8	native	99A6817-002.002							
96698	12.4-12.8	native	99A6649-003.002							
96698	17.7-18.3	native	99A7930-001.002							
96698	20.2-20.6	native	99A7930-002.002							
96698	22.4-22.8	bedrock	99A7930-003.002							
96698	4.2-4.6	native	99A6649-001.002							
96698	8.2-8.6	native	99A6649-002.002							
96798	12.5-12.9	native	99A6650-003.002							
96798	16.0-16.4	native	99A6650-004.002							
96798	20.4-20.8	native	99A6650-005.002							
96798	8.4-8.8	native	99A6650-002.002							
96898	12.3-12.6	native	99A6307-003.002							
96898	17.1-17.4	bedrock	99A6307-004.002							
96898	4.4-4.7	native	99A6307-001.002							



Appendix E  
Real VOC Data

Borehole	Sample Interval	Material	RIN/Event/Bottle	lab_result_qualifier_codes	CHLOROETHANE (ug/kg)	CHLOROFORM (ug/kg)	Chloromethane (ug/kg)	CIS-1,2-DICHLOROETHENE (ug/kg)	CIS-1,3-DICHLOROPROPENE (ug/kg)	CIS-1,3-DICHLOROPROPYLENE (ug/kg)
96998	8.4-8.7	native	99A6307-002.002							
96998	4.4-4.8	native	99A6824-001.002							
96998	8.4-8.8	native	99A6824-002.002							
97198	20.4-20.8	native	99A4102-002.015							
97198	24.4-24.8	bedrock	99A4102-002.018							
97298	12.4-12.8	native	99A6825-003.002							
97298	16.4-17.0	native	99A6825-004.002							
97298	17.7-18.2	bedrock	99A6825-005.002							
97298	4.0-4.4	native	99A6825-001.002							
97298	8.4-8.8	native	99A6825-002.002							
97698	11.2-11.6	native	99A8275-003.002							
97698	13.5-13.9	native	99A8275-004.002							
97698	16.3-16.7	native	99A8275-005.002							
97698	18.2-18.8	native	99A8275-008.002							
97698	19.4-19.8	native	99A8275-009.002							
97698	4.6-5.8	native	99A8275-001.002							
97698	8.2-8.6	native	99A8275-002.002							
90998	3.8-4.0	native	98A2015-001.010	B						
91198	11.6-11.9	native	98A1091-001.035	B						
91198	15.5-15.8	native	98A1091-001.036	B						
91198	19.1-19.5	native	98A1091-001.037	B						
91198	19.5-19.8	bedrock	98A1091-001.038	B						
91198	7.7-8.0	native	98A1091-001.034	B						
92598	12.0-12.5	native	98A1092-001.035	B						
92598	16.0-16.75	bedrock	98A1092-001.036	B						
92598	3.5-4.0	native	98A1092-001.033	B						
92598	7.5-8.0	native	98A1092-001.034	B						
97698	11.2-11.6	native	99A8275-003.002	B						
97698	13.5-13.9	native	99A8275-004.002	B						
97698	16.3-16.7	native	99A8275-005.002	B						
97698	18.2-18.8	native	99A8275-008.002	B						
95998	24.6-25.0	bedrock	99A7799-006.002	BJ						
96598	15.2-15.6	native	99A6817-004.002	BJ						
97198	24.4-24.8	bedrock	99A4102-002.018	BJ						
97698	11.2-11.6	native	99A8275-003.002	BJ			0.65			
97698	13.5-13.9	native	99A8275-004.002	BJ			0.76			
97698	16.3-16.7	native	99A8275-005.002	BJ			0.64			
97698	18.2-18.8	native	99A8275-008.002	BJ			0.67			
97698	4.6-5.8	native	99A8275-001.002	BJ			0.68			
97698	8.2-8.6	native	99A8275-002.002	BJ			0.68			
95998	24.6-25.0	bedrock	99A7799-006.002	E						
95998	5.0-5.6	native	99A7799-001.002	E						
97698	11.2-11.6	native	99A8275-003.002	E						



Appendix E  
Real VOC Data

Borehole	Sample Interval	Material	RIN/Event/Bottle	lab_result_qualifier_codes	CHLOROETHANE (ug/kg)	CHLOROFORM (ug/kg)	Chloromethane (ug/kg)	CIS-1,2-DICHLOROETHENE (ug/kg)	CIS-1,3-DICHLOROPROPENE (ug/kg)	CIS-1,3-DICHLOROPROPYLENE (ug/kg)
97698	13.5-13.9	native	99A8275-004.002	E						
97698	16.3-16.7	native	99A8275-005.002	E						
97698	18.2-18.8	native	99A8275-008.002	E						
90998	3.8-4.0	native	98A2015-001.010	J						
95998	12.4-12.8	native	99A7799-003.002	J						
95998	17.7-18.2	native	99A7799-005.002	J						
95998	24.6-25.0	bedrock	99A7799-006.002	J		3.5				
95998	5.0-5.6	native	99A7799-001.002	J						
96198	4.4-4.7	native	99A3210-003.013	J						
96398	12.4-12.7	native	99A4102-001.009	J						
96398	16.2-16.4	bedrock	99A4102-001.012	J						
96398	4.3-4.8	native	99A4102-001.003	J						
96398	8.4-8.9	native	99A4102-001.006	J						
96498	4.8-5.2	native	99A3210-001.013	J						
96598	11.6-12.0	native	99A6817-003.002	J						
96598	22.3-22.7	bedrock	99A6817-006.002	J						
96598	8.4-8.8	native	99A6817-002.002	J						
96598	12.4-12.8	native	99A6649-003.002	J						
96698	17.7-18.3	native	99A7930-001.002	J						
96698	20.2-20.6	native	99A7930-002.002	J						
96698	22.4-22.8	bedrock	99A7930-003.002	J		1.2				
96798	12.5-12.9	native	99A6650-003.002	J						
96798	16.0-16.4	native	99A6650-004.002	J						
96798	20.4-20.8	native	99A6650-005.002	J						
96798	8.4-8.8	native	99A6650-002.002	J						
96898	17.1-17.4	bedrock	99A6307-004.002	J		0.71				
96998	4.4-4.8	native	99A6824-001.002	J						
96998	8.4-8.8	native	99A6824-002.002	J						
97098	4.2-4.7	native	99A6308-001.003	J						
97098	8.4-8.8	native	99A6308-002.003	J						
97198	12.4-12.8	native	99A4102-002.009	J						
97198	15.5-16.1	native	99A4102-002.012	J						
97198	4.4-4.8	native	99A4102-002.006	J						
97198	7.3-7.6	native	99A4102-002.003	J						
97298	12.4-12.8	native	99A6825-003.002	J						
97298	4.0-4.4	native	99A6825-001.002	J						
97298	8.4-8.8	native	99A6825-002.002	J						
97698	11.2-11.6	native	99A8275-003.002	J						
97698	13.5-13.9	native	99A8275-004.002	J						
97698	16.3-16.7	native	99A8275-005.002	J						
97698	18.2-18.8	native	99A8275-008.002	J						
97698	19.4-19.8	native	99A8275-009.002	J						
97698	8.2-8.6	native	99A8275-002.002	J						

Appendix E  
Real VOC Data

Borehole	Sample Interval	Material	RIN/Event/Bottle	lab_result_qualifier_codes	CHLOROETHANE (ug/kg)	CHLOROFORM (ug/kg)	Chloromethane (ug/kg)	CIS-1,2-DICHLOROETHENE (ug/kg)	CIS-1,3-DICHLOROPROPENE (ug/kg)	CIS-1,3-DICHLOROPROPYLENE (ug/kg)
91198	11.6-11.9	native	98A1091-001.035	JB						
91198	15.5-15.8	native	98A1091-001.036	JB						
91198	3.1-3.4	native	98A1091-001.033	JB			400			
91198	7.7-8.0	native	98A1091-001.034	JB						
92598	12.0-12.5	native	98A1092-001.035	JB						
92598	16.0-16.75	bedrock	98A1092-001.036	JB						
96598	22.3-22.7	bedrock	99A6817-006.002	JB	0.98					
96698	12.4-12.8	native	99A6649-003.002	JB						
96698	4.2-4.6	native	99A6649-001.002	JB						
96698	8.2-8.6	native	99A6649-002.002	JB						
96798	12.5-12.9	native	99A6650-003.002	JB						
96798	16.0-16.4	native	99A6650-004.002	JB						
96798	20.4-20.8	native	99A6650-005.002	JB						
96798	4.4-4.8	native	99A6650-001.002	JB						
96798	8.4-8.8	native	99A6650-002.002	JB						
96898	12.3-12.6	native	99A6307-003.002	JB						
96898	17.1-17.4	bedrock	99A6307-004.002	JB						
96898	4.4-4.7	native	99A6307-001.002	JB						
96898	8.4-8.7	native	99A6307-002.002	JB						
96998	12.4-12.7	native	99A6824-003.002	JB						
96998	17.2-17.8	bedrock	99A6824-004.002	JB						
96998	4.4-4.8	native	99A6824-001.002	JB						
96998	8.4-8.8	native	99A6824-002.002	JB						
97098	16.5-17.0	bedrock	99A6308-004.003	JB	0.6					
97298	16.4-17.0	native	99A6825-004.002	JB						
97298	17.7-18.2	bedrock	99A6825-005.002	JB						
97698	19.4-19.8	native	99A8275-009.002	JB						
90998	3.8-4.0	native	98A2015-001.010	U		790	1600		790	
91198	11.6-11.9	native	98A1091-001.035	U		690	1400		690	
91198	15.5-15.8	native	98A1091-001.036	U		680	1400	680	680	
91198	19.1-19.5	native	98A1091-001.037	U		630	1300	630	630	
91198	19.5-19.8	bedrock	98A1091-001.038	U		620	1200	620	620	
91198	3.1-3.4	native	98A1091-001.033	U		710	1400	710	710	
91198	7.7-8.0	native	98A1091-001.034	U		680	1400	680	680	
92598	12.0-12.5	native	98A1092-001.035	U		700	1400	700	700	
92598	16.0-16.75	bedrock	98A1092-001.036	U		720	1400	720	720	
92598	3.5-4.0	native	98A1092-001.033	U		650	1300	650	650	
92598	7.5-8.0	native	98A1092-001.034	U		610	1200	610	610	
95998	12.4-12.8	native	99A7799-003.002	U	5.8	5.8				5.8
95998	14.8-15.2	native	99A7799-004.002	U	5.3	5.3				5.3
95998	17.7-18.2	native	99A7799-005.002	U	5.6	5.6				5.6
95998	24.6-25.0	bedrock	99A7799-006.002	U	6.3	6.3				6.3
95998	5.0-5.6	native	99A7799-001.002	U	5.6	5.6				5.6

Appendix E  
Real VOC Data

Borehole	Sample Interval	Material	RIN/Event/Bottle	lab_result_qualifier_codes	CHLOROETHANE (ug/kg)	CHLOROFORM (ug/kg)	Chloromethane (ug/kg)	CIS-1,2-DICHLOROETHENE (ug/kg)	CIS-1,3-DICHLOROPROPENE (ug/kg)	CIS-1,3-DICHLOROPROPYLENE (ug/kg)
95998	8.4-8.8	native	99A7799-002.002	U	5.2	5.2		700	700	5.2
96098	12.5-13.0	native	99A3210-002.015	U	700	700	700	700	700	
96098	16.0-16.2	bedrock	99A3210-002.016	U	700	700	700	700	700	
96098	4.5-4.8	native	99A3210-002.013	U	730	730	730	730	730	
96098	8.5-8.8	native	99A3210-002.014	U	690	690	690	690	690	
96198	12.0-12.5	native	99A3210-003.015	U	760	760	760	760	760	
96198	15.8-16.2	bedrock	99A3210-003.016	U	700	700	700	700	700	
96198	4.4-4.7	native	99A3210-003.013	U	700	700	700	700	700	
96198	8.1-8.5	native	99A3210-003.014	U	670	670	670	670	670	
96298	12.25-12.75	native	99A3210-004.016	U	750	750	750	750	750	
96298	16.1-16.5	bedrock	99A3210-004.017	U	720	720	720	720	720	
96298	4.3-4.7	native	99A3210-004.013	U	700	700	700	700	700	
96298	8.0-9.0	native	99A3210-004.014	U	670	670	670	670	670	
96398	12.4-12.7	native	99A4102-001.009	U	710	710	710	710	710	
96398	16.2-16.4	bedrock	99A4102-001.012	U	730	730	730	730	730	
96398	4.3-4.8	native	99A4102-001.003	U	700	700	700	700	700	
96398	8.4-8.9	native	99A4102-001.006	U	710	710	710	710	710	
96498	13-13.5	native	99A3210-001.015	U	1300	1300	1300		1300	
96498	16.0-16.5	native	99A3210-001.016	U	1300	1300	1300		1300	
96498	18.0-18.6	native	99A3210-001.017	U	1300	1300	1300		1300	
96498	22.0-22.5	bedrock	99A3210-001.018	U	1500	1500	1500		1500	
96498	4.8-5.2	native	99A3210-001.013	U	1500	1500	1500		1500	
96498	9.5-10.0	native	99A3210-001.014	U	1300	1300	1300		1300	
96598	11.6-12.0	native	99A6817-003.002	U	5.4	5.4				5.4
96598	15.2-15.6	native	99A6817-004.002	U	6	6				6
96598	18.6-18.9	native	99A6817-005.002	U	5.3	5.3				5.3
96598	22.3-22.7	bedrock	99A6817-006.002	U	6.2					6.2
96598	4.2-4.6	native	99A6817-001.002	U	5.7	5.7				5.7
96598	8.4-8.8	native	99A6817-002.002	U	5.3	5.3				5.3
96698	12.4-12.8	native	99A6649-003.002	U	5.9	5.9				5.9
96698	17.7-18.3	native	99A7930-001.002	U	5.6	5.6				5.6
96698	20.2-20.6	native	99A7930-002.002	U	5.4	5.4				5.4
96698	22.4-22.8	bedrock	99A7930-003.002	U	6.4					6.4
96698	4.2-4.6	native	99A6649-001.002	U	5.7	5.7				5.7
96698	8.2-8.6	native	99A6649-002.002	U	5.6	5.6				5.6
96798	12.5-12.9	native	99A6650-003.002	U	6.2	6.2				6.2
96798	16.0-16.4	native	99A6650-004.002	U	7.2	7.2				7.2
96798	20.4-20.8	native	99A6650-005.002	U	7.4					7.4
96798	4.4-4.8	native	99A6650-001.002	U	5.3	5.3				5.3
96798	8.4-8.8	native	99A6650-002.002	U	6.3	6.3				6.3
96898	12.3-12.6	native	99A6307-003.002	U	6.4	6.4				6.4
96898	17.1-17.4	bedrock	99A6307-004.002	U	5.3					5.3
96898	4.4-4.7	native	99A6307-001.002	U	5.2	5.2				5.2

Appendix E  
Real VOC Data

Borehole	Sample Interval	Material	RIN/Event/Bottle	lab_result_qualifier_codes	CHLOROETHANE (ug/kg)	CHLOROFORM (ug/kg)	Chloromethane (ug/kg)	CIS-1,2-DICHLOROETHENE (ug/kg)	CIS-1,3-DICHLOROPROPENE (ug/kg)	CIS-1,3-DICHLOROPROPYLENE (ug/kg)
96898	8.4-8.7	native	99A6307-002.002	U	5.2	5.2				5.2
96998	12.4-12.7	native	99A6824-003.002	U	5.6	5.6				5.6
96998	17.2-17.8	bedrock	99A6824-004.002	U	5.7	5.7				5.7
96998	4.4-4.8	native	99A6824-001.002	U	5.3	5.3				5.3
96998	8.4-8.8	native	99A6824-002.002	U	5.2	5.2				5.2
97098	12.4-12.6	native	99A6308-003.003	U	5.1	5.1				5.1
97098	16.5-17.0	bedrock	99A6308-004.003	U	5.7	5.7				5.7
97098	4.2-4.7	native	99A6308-001.003	U	5.5	5.5				5.5
97098	8.4-8.8	native	99A6308-002.003	U	5.8	5.8				5.8
97198	12.4-12.8	native	99A4102-002.009	U	650	650	650	650	650	
97198	15.5-16.1	native	99A4102-002.012	U	740	740	740	740	740	
97198	20.4-20.8	native	99A4102-002.015	U	670	670	670	670	670	
97198	24.4-24.8	bedrock	99A4102-002.018	U	700	700	700	700	700	
97198	4.4-4.8	native	99A4102-002.006	U	700	700	700	700	700	
97198	7.3-7.6	native	99A4102-002.003	U	650	650	650	650	650	
97298	12.4-12.8	native	99A6825-003.002	U	5.3	5.3				5.3
97298	16.4-17.0	native	99A6825-004.002	U	5.4	5.4				5.4
97298	17.7-18.2	bedrock	99A6825-005.002	U	6.1	6.1				6.1
97298	4.0-4.4	native	99A6825-001.002	U	5.4	5.4				5.4
97298	8.4-8.8	native	99A6825-002.002	U	5.7	5.7				5.7
97698	11.2-11.6	native	99A8275-003.002	U	5.2	5.2				5.2
97698	13.5-13.9	native	99A8275-004.002	U	5.4	5.4				5.4
97698	16.3-16.7	native	99A8275-005.002	U	5.3	5.3				5.3
97698	18.2-18.8	native	99A8275-008.002	U	5.6	5.6				5.6
97698	19.4-19.8	native	99A8275-009.002	U	5.7	5.7				5.7
97698	4.6-5.8	native	99A8275-001.002	U	5.3	5.3				5.3
97698	8.2-8.6	native	99A8275-002.002	U	5.3	5.3				5.3

Appendix E  
Real VOC Data

Borehole	Sample Interval	Material	RIN/Event/Bottle	lab_result_qualifier_codes	Chloroethane (ug/kg)	Dibromochloromethane (ug/kg)	DIBROMOFLUOROMETHANE (ug/kg)	DIBROMOMETHANE (ug/kg)	DICHLOROBROMOMETHANE (ug/kg)
90998	3.8-4.0	native	98A2015-001.010						
91198	11.6-11.9	native	98A1091-001.035						
91198	15.5-15.8	native	98A1091-001.036						
91198	19.1-19.5	native	98A1091-001.037						
91198	19.5-19.8	bedrock	98A1091-001.038						
91198	3.1-3.4	native	98A1091-001.033						
91198	7.7-8.0	native	98A1091-001.034						
92598	12.0-12.5	native	98A1092-001.035						
92598	16.0-16.75	bedrock	98A1092-001.036						
92598	3.5-4.0	native	98A1092-001.033						
92598	7.5-8.0	native	98A1092-001.034						
95998	12.4-12.8	native	99A7799-003.002				50.2		
95998	14.8-15.2	native	99A7799-004.002				45.3		
95998	17.7-18.2	native	99A7799-005.002				46.4		
95998	24.6-25.0	bedrock	99A7799-006.002				52.6		
95998	5.0-5.6	native	99A7799-001.002				47.4		
95998	8.4-8.8	native	99A7799-002.002				43.1		
96298	16.1-16.5	bedrock	99A3210-004.017				106		
96498	13-13.5	native	99A3210-001.015						
96498	16.0-16.5	native	99A3210-001.016						
96498	18.0-18.6	native	99A3210-001.017						
96498	22.0-22.5	bedrock	99A3210-001.018						
96498	4.8-5.2	native	99A3210-001.013						
96498	9.5-10.0	native	99A3210-001.014						
96598	11.6-12.0	native	99A6817-003.002				45.6		
96598	15.2-15.6	native	99A6817-004.002				53.5		
96598	18.6-18.9	native	99A6817-005.002				45.4		
96598	22.3-22.7	bedrock	99A6817-006.002				60.1		
96598	4.2-4.6	native	99A6817-001.002				48.4		
96598	8.4-8.8	native	99A6817-002.002				46.4		
96698	12.4-12.8	native	99A6649-003.002				59.2		
96698	17.7-18.3	native	99A7930-001.002				46.8		
96698	20.2-20.6	native	99A7930-002.002				45		
96698	22.4-22.8	bedrock	99A7930-003.002				53.9		
96698	4.2-4.6	native	99A6649-001.002				52.2		
96698	8.2-8.6	native	99A6649-002.002				53		
96798	12.5-12.9	native	99A6650-003.002				51.7		
96798	16.0-16.4	native	99A6650-004.002				68.6		
96798	20.4-20.8	native	99A6650-005.002				70.9		
96798	8.4-8.8	native	99A6650-002.002				58.5		
96898	12.3-12.6	native	99A6307-003.002				57.1		
96898	17.1-17.4	bedrock	99A6307-004.002				46.7		
96898	4.4-4.7	native	99A6307-001.002				44.6		

Appendix E  
Real VOC Data

Borehole	Sample Interval	Material	RIN/Event/Bottle	lab_result_qualifier_codes	Dibromochloromethane (ug/kg)	DIBROMOFLUOROMETHANE (ug/kg)	DIBROMOMETHANE (ug/kg)	DICHLOROBROMOMETHANE (ug/kg)
96898	8.4-8.7	native	99A6307-002.002			45.7		
96998	4.4-4.8	native	99A6824-001.002			49.9		
96998	8.4-8.8	native	99A6824-002.002			51.1		
97198	20.4-20.8	native	99A4102-002.015			98.42		
97198	24.4-24.8	bedrock	99A4102-002.018			85.56		
97298	12.4-12.8	native	99A6825-003.002			47.7		
97298	16.4-17.0	native	99A6825-004.002			52.7		
97298	17.7-18.2	bedrock	99A6825-005.002			58.3		
97298	4.0-4.4	native	99A6825-001.002			47.4		
97298	8.4-8.8	native	99A6825-002.002			50.6		
97698	11.2-11.6	native	99A8275-003.002			47.6		
97698	13.5-13.9	native	99A8275-004.002			50.1		
97698	16.3-16.7	native	99A8275-005.002			48.4		
97698	18.2-18.8	native	99A8275-008.002			50.7		
97698	19.4-19.8	native	99A8275-009.002			51.1		
97698	4.6-5.8	native	99A8275-001.002			47.8		
97698	8.2-8.6	native	99A8275-002.002			45.6		
90998	3.8-4.0	native	98A2015-001.010	B				
91198	11.6-11.9	native	98A1091-001.035	B				
91198	15.5-15.8	native	98A1091-001.036	B				
91198	19.1-19.5	native	98A1091-001.037	B				
91198	19.5-19.8	bedrock	98A1091-001.038	B				
91198	7.7-8.0	native	98A1091-001.034	B				
92598	12.0-12.5	native	98A1092-001.035	B				
92598	16.0-16.75	bedrock	98A1092-001.036	B				
92598	3.5-4.0	native	98A1092-001.033	B				
92598	7.5-8.0	native	98A1092-001.034	B				
97698	11.2-11.6	native	99A8275-003.002	B				
97698	13.5-13.9	native	99A8275-004.002	B				
97698	16.3-16.7	native	99A8275-005.002	B				
97698	18.2-18.8	native	99A8275-008.002	B				
95998	24.6-25.0	bedrock	99A7799-006.002	BJ				
96598	15.2-15.6	native	99A6817-004.002	BJ				
97198	24.4-24.8	bedrock	99A4102-002.018	BJ				
97698	11.2-11.6	native	99A8275-003.002	BJ				
97698	13.5-13.9	native	99A8275-004.002	BJ				
97698	16.3-16.7	native	99A8275-005.002	BJ				
97698	18.2-18.8	native	99A8275-008.002	BJ				
97698	4.6-5.8	native	99A8275-001.002	BJ				
97698	8.2-8.6	native	99A8275-002.002	BJ				
95998	24.6-25.0	bedrock	99A7799-006.002	E				
95998	5.0-5.6	native	99A7799-001.002	E				
97698	11.2-11.6	native	99A8275-003.002	E				

Appendix E  
Real VOC Data

Borehole	Sample Interval	Material	RIN/Event/Bottle	lab_result_qualifier_codes	Dibromochloromethane (ug/kg)	DIBROMOFLUOROMETHANE (ug/kg)	DIBROMOMETHANE (ug/kg)	DICHLOROBROMOMETHANE (ug/kg)
97698	13.5-13.9	native	99A8275-004.002	E				
97698	16.3-16.7	native	99A8275-005.002	E				
97698	18.2-18.8	native	99A8275-008.002	E				
90998	3.8-4.0	native	98A2015-001.010	J				
95998	12.4-12.8	native	99A7799-003.002	J				
95998	17.7-18.2	native	99A7799-005.002	J				
95998	24.6-25.0	bedrock	99A7799-006.002	J				
95998	5.0-5.6	native	99A7799-001.002	J				
96198	4.4-4.7	native	99A3210-003.013	J				
96398	12.4-12.7	native	99A4102-001.009	J				
96398	16.2-16.4	bedrock	99A4102-001.012	J				
96398	4.3-4.8	native	99A4102-001.003	J				
96398	8.4-8.9	native	99A4102-001.006	J				
96498	4.8-5.2	native	99A3210-001.013	J				
96598	11.6-12.0	native	99A6817-003.002	J				
96598	22.3-22.7	bedrock	99A6817-006.002	J				
96598	8.4-8.8	native	99A6817-002.002	J				
96698	12.4-12.8	native	99A6649-003.002	J				
96698	17.7-18.3	native	99A7930-001.002	J				
96698	20.2-20.6	native	99A7930-002.002	J				
96698	22.4-22.8	bedrock	99A7930-003.002	J				
96798	12.5-12.9	native	99A6650-003.002	J				
96798	16.0-16.4	native	99A6650-004.002	J				
96798	20.4-20.8	native	99A6650-005.002	J				
96798	8.4-8.8	native	99A6650-002.002	J				
96898	17.1-17.4	bedrock	99A6307-004.002	J				
96998	4.4-4.8	native	99A6824-001.002	J				
96998	8.4-8.8	native	99A6824-002.002	J				
96998	4.2-4.7	native	99A6308-001.003	J				
97098	8.4-8.8	native	99A6308-002.003	J				
97198	12.4-12.8	native	99A4102-002.009	J				
97198	15.5-16.1	native	99A4102-002.012	J				
97198	4.4-4.8	native	99A4102-002.006	J				
97198	7.3-7.6	native	99A4102-002.003	J				
97298	12.4-12.8	native	99A6825-003.002	J				
97298	4.0-4.4	native	99A6825-001.002	J				
97298	8.4-8.8	native	99A6825-002.002	J				
97698	11.2-11.6	native	99A8275-003.002	J				
97698	13.5-13.9	native	99A8275-004.002	J				
97698	16.3-16.7	native	99A8275-005.002	J				
97698	18.2-18.8	native	99A8275-008.002	J				
97698	19.4-19.8	native	99A8275-009.002	J				
97698	8.2-8.6	native	99A8275-002.002	J				



Appendix E  
Real VOC Data

Borehole	Sample Interval	Material	RIN/Event/Bottle	lab_result_qualifier_codes	Chloroethane (ug/kg)	Dibromochloromethane (ug/kg)	DIBROMOFLUOROMETHANE (ug/kg)	DIBROMOMETHANE (ug/kg)	DICHLOROBROMOMETHANE (ug/kg)
91198	11.6-11.9	native	98A1091-001.035	JB					
91198	15.5-15.8	native	98A1091-001.036	JB					
91198	3.1-3.4	native	98A1091-001.033	JB					
91198	7.7-8.0	native	98A1091-001.034	JB					
92598	12.0-12.5	native	98A1092-001.035	JB					
92598	16.0-16.75	bedrock	98A1092-001.036	JB					
96598	22.3-22.7	bedrock	99A6817-006.002	JB					
96698	12.4-12.8	native	99A6649-003.002	JB					
96698	4.2-4.6	native	99A6649-001.002	JB					
96698	8.2-8.6	native	99A6649-002.002	JB					
96798	12.5-12.9	native	99A6650-003.002	JB					
96798	16.0-16.4	native	99A6650-004.002	JB					
96798	20.4-20.8	native	99A6650-005.002	JB					
96798	4.4-4.8	native	99A6650-001.002	JB					
96798	8.4-8.8	native	99A6650-002.002	JB					
96898	12.3-12.6	native	99A6307-003.002	JB					
96898	17.1-17.4	bedrock	99A6307-004.002	JB					
96898	4.4-4.7	native	99A6307-001.002	JB					
96898	8.4-8.7	native	99A6307-002.002	JB					
96998	12.4-12.7	native	99A6824-003.002	JB					
96998	17.2-17.8	bedrock	99A6824-004.002	JB					
96998	4.4-4.8	native	99A6824-001.002	JB					
96998	8.4-8.8	native	99A6824-002.002	JB					
97098	16.5-17.0	bedrock	99A6308-004.003	JB					
97298	16.4-17.0	native	99A6825-004.002	JB					
97298	17.7-18.2	bedrock	99A6825-005.002	JB					
97698	19.4-19.8	native	99A8275-009.002	JB					
90998	3.8-4.0	native	98A2015-001.010	U	1600	790		790	
91198	11.6-11.9	native	98A1091-001.035	U	1400	690		690	
91198	15.5-15.8	native	98A1091-001.036	U	1400	680		680	
91198	19.1-19.5	native	98A1091-001.037	U	1300	630		630	
91198	19.5-19.8	bedrock	98A1091-001.038	U	1200	620		620	
91198	3.1-3.4	native	98A1091-001.033	U		710		710	
91198	7.7-8.0	native	98A1091-001.034	U	1400	680		680	
92598	12.0-12.5	native	98A1092-001.035	U	1400	700		700	
92598	16.0-16.75	bedrock	98A1092-001.036	U	1400	720		720	
92598	3.5-4.0	native	98A1092-001.033	U	1300	650		650	
92598	7.5-8.0	native	98A1092-001.034	U	1200	610		610	
95998	12.4-12.8	native	99A7799-003.002	U				5.8	5.8
95998	14.8-15.2	native	99A7799-004.002	U				5.3	5.3
95998	17.7-18.2	native	99A7799-005.002	U				5.6	5.6
95998	24.6-25.0	bedrock	99A7799-006.002	U				6.3	6.3
95998	5.0-5.6	native	99A7799-001.002	U				5.6	5.6



Appendix E  
Real VOC Data

Borehole	Sample Interval	Material	RIN/Event/Bottle	lab_result_qualifier_codes	Chloroethane (ug/kg)	Dibromochloromethane (ug/kg)	DIBROMOFLUOROMETHANE (ug/kg)	DIBROMOMETHANE (ug/kg)	DICHLOROBROMOMETHANE (ug/kg)
95998 8.4-8.8	native	99A7799-002.002	U					5.2	5.2
96098 12.5-13.0	native	99A3210-002.015	U			700		700	
96098 16.0-16.2	bedrock	99A3210-002.016	U			700		700	
96098 4.5-4.8	native	99A3210-002.013	U			730		730	
96098 8.5-8.8	native	99A3210-002.014	U			690		690	
96198 12.0-12.5	native	99A3210-003.015	U			760		760	
96198 15.8-16.2	bedrock	99A3210-003.016	U			700		700	
96198 4.4-4.7	native	99A3210-003.013	U			700		700	
96198 8.1-8.5	native	99A3210-003.014	U			670		670	
96298 12.25-12.75	native	99A3210-004.016	U			750		750	
96298 16.1-16.5	bedrock	99A3210-004.017	U			720		720	
96298 4.3-4.7	native	99A3210-004.013	U			700		700	
96298 8.0-9.0	native	99A3210-004.014	U			670		670	
96398 12.4-12.7	native	99A4102-001.009	U			710		710	
96398 16.2-16.4	bedrock	99A4102-001.012	U			730		730	
96398 4.3-4.8	native	99A4102-001.003	U			700		700	
96398 8.4-8.9	native	99A4102-001.006	U			710		710	
96498 13-13.5	native	99A3210-001.015	U			1300			
96498 16.0-16.5	native	99A3210-001.016	U			1300			
96498 18.0-18.6	native	99A3210-001.017	U			1300			
96498 22.0-22.5	bedrock	99A3210-001.018	U			1500			
96498 4.8-5.2	native	99A3210-001.013	U			1500			
96498 9.5-10.0	native	99A3210-001.014	U			1300			
96598 11.6-12.0	native	99A6817-003.002	U					5.4	5.4
96598 15.2-15.6	native	99A6817-004.002	U					6	6
96598 18.6-18.9	native	99A6817-005.002	U					5.3	5.3
96598 22.3-22.7	bedrock	99A6817-006.002	U					6.2	6.2
96598 4.2-4.6	native	99A6817-001.002	U					5.7	5.7
96598 8.4-8.8	native	99A6817-002.002	U					5.3	5.3
96698 12.4-12.8	native	99A6649-003.002	U					5.9	5.9
96698 17.7-18.3	native	99A7930-001.002	U					5.6	5.6
96698 20.2-20.6	native	99A7930-002.002	U					5.4	5.4
96698 22.4-22.8	bedrock	99A7930-003.002	U					6.4	6.4
96698 4.2-4.6	native	99A6649-001.002	U					5.7	5.7
96698 8.2-8.6	native	99A6649-002.002	U					5.6	5.6
96798 12.5-12.9	native	99A6650-003.002	U					6.2	6.2
96798 16.0-16.4	native	99A6650-004.002	U					7.2	7.2
96798 20.4-20.8	native	99A6650-005.002	U					7.4	7.4
96798 4.4-4.8	native	99A6650-001.002	U					5.3	5.3
96798 8.4-8.8	native	99A6650-002.002	U					6.3	6.3
96898 12.3-12.6	native	99A6307-003.002	U					6.4	6.4
96898 17.1-17.4	bedrock	99A6307-004.002	U					5.3	5.3
96898 4.4-4.7	native	99A6307-001.002	U					5.2	5.2

Appendix E  
Real VOC Data

Borehole	Sample Interval	Material	RIN/Event/Bottle	lab_result_qualifier_codes	Chloroethane (ug/kg)	Dibromochloromethane (ug/kg)	DIBROMOFLUOROMETHANE (ug/kg)	DIBROMOMETHANE (ug/kg)	DICHLOROBROMOMETHANE (ug/kg)
96898	8.4-8.7	native	99A6307-002.002	U				5.2	5.2
96998	12.4-12.7	native	99A6824-003.002	U				5.6	5.6
96998	17.2-17.8	bedrock	99A6824-004.002	U				5.7	5.7
96998	4.4-4.8	native	99A6824-001.002	U				5.3	5.3
96998	8.4-8.8	native	99A6824-002.002	U				5.2	5.2
97098	12.4-12.6	native	99A6308-003.003	U				5.1	5.1
97098	16.5-17.0	bedrock	99A6308-004.003	U				5.7	5.7
97098	4.2-4.7	native	99A6308-001.003	U				5.5	5.5
97098	8.4-8.8	native	99A6308-002.003	U				5.8	5.8
97198	12.4-12.8	native	99A4102-002.009	U		650		650	
97198	15.5-16.1	native	99A4102-002.012	U		740		740	
97198	20.4-20.8	native	99A4102-002.015	U		670		670	
97198	24.4-24.8	bedrock	99A4102-002.018	U		700		700	
97198	4.4-4.8	native	99A4102-002.006	U		700		700	
97198	7.3-7.6	native	99A4102-002.003	U		650		650	
97298	12.4-12.8	native	99A6825-003.002	U				5.3	5.3
97298	16.4-17.0	native	99A6825-004.002	U				5.4	5.4
97298	17.7-18.2	bedrock	99A6825-005.002	U				6.1	6.1
97298	4.0-4.4	native	99A6825-001.002	U				5.4	5.4
97298	8.4-8.8	native	99A6825-002.002	U				5.7	5.7
97698	11.2-11.6	native	99A8275-003.002	U				5.2	5.2
97698	13.5-13.9	native	99A8275-004.002	U				5.4	5.4
97698	16.3-16.7	native	99A8275-005.002	U				5.3	5.3
97698	18.2-18.8	native	99A8275-008.002	U				5.6	5.6
97698	19.4-19.8	native	99A8275-009.002	U				5.7	5.7
97698	4.6-5.8	native	99A8275-001.002	U				5.3	5.3
97698	8.2-8.6	native	99A8275-002.002	U				5.3	5.3

Appendix E  
Real VOC Data

Borehole	Sample Interval	Material	RIN/Event/Bottle	lab_result_qualifier_codes	DICHLORODIFLUOROMETHANE (ug/kg)	ETHYLBENZENE (ug/kg)	FREON 113 (ug/kg)	HEXACHLOROBUTADIENE (ug/kg)	ISOPROPYL BENZENE (ug/kg)	ISOPROPYLBENZENE (ug/kg)
90998	3.8-4.0	native	98A2015-001.010							
91198	11.6-11.9	native	98A1091-001.035							
91198	15.5-15.8	native	98A1091-001.036							
91198	19.1-19.5	native	98A1091-001.037							
91198	19.5-19.8	bedrock	98A1091-001.038							
91198	3.1-3.4	native	98A1091-001.033							
91198	7.7-8.0	native	98A1091-001.034							
92598	12.0-12.5	native	98A1092-001.035							
92598	16.0-16.75	bedrock	98A1092-001.036							
92598	3.5-4.0	native	98A1092-001.033							
92598	7.5-8.0	native	98A1092-001.034							
95998	12.4-12.8	native	99A7799-003.002							
95998	14.8-15.2	native	99A7799-004.002							
95998	17.7-18.2	native	99A7799-005.002							
95998	24.6-25.0	bedrock	99A7799-006.002							
95998	5.0-5.6	native	99A7799-001.002							
95998	8.4-8.8	native	99A7799-002.002							
96298	16.1-16.5	bedrock	99A3210-004.017							
96498	13-13.5	native	99A3210-001.015							
96498	16.0-16.5	native	99A3210-001.016							
96498	18.0-18.6	native	99A3210-001.017							
96498	22.0-22.5	bedrock	99A3210-001.018							
96498	4.8-5.2	native	99A3210-001.013							
96498	9.5-10.0	native	99A3210-001.014							
96598	11.6-12.0	native	99A6817-003.002							
96598	15.2-15.6	native	99A6817-004.002							
96598	18.6-18.9	native	99A6817-005.002							
96598	22.3-22.7	bedrock	99A6817-006.002							
96598	4.2-4.6	native	99A6817-001.002							
96598	8.4-8.8	native	99A6817-002.002							
96698	12.4-12.8	native	99A6649-003.002							
96698	17.7-18.3	native	99A7930-001.002							
96698	20.2-20.6	native	99A7930-002.002							
96698	22.4-22.8	bedrock	99A7930-003.002							
96698	4.2-4.6	native	99A6649-001.002							
96698	8.2-8.6	native	99A6649-002.002							
96798	12.5-12.9	native	99A6650-003.002							
96798	16.0-16.4	native	99A6650-004.002							
96798	20.4-20.8	native	99A6650-005.002							
96798	8.4-8.8	native	99A6650-002.002							
96898	12.3-12.6	native	99A6307-003.002							
96898	17.1-17.4	bedrock	99A6307-004.002							
96898	4.4-4.7	native	99A6307-001.002							

Appendix E  
Real VOC Data

Borehole	Sample Interval	Material	RIN/Event/Bottle	lab_result_qualifier_codes	DICHLORODIFLUOROMETHANE (ug/kg)	ETHYLBENZENE (ug/kg)	FREON 113 (ug/kg)	HEXACHLOROBUTADIENE (ug/kg)	ISOPROPYL BENZENE (ug/kg)	ISOPROPYLBENZENE (ug/kg)
96898	8.4-8.7	native	99A6307-002.002							
96998	4.4-4.8	native	99A6824-001.002							
96998	8.4-8.8	native	99A6824-002.002							
97198	20.4-20.8	native	99A4102-002.015							
97198	24.4-24.8	bedrock	99A4102-002.018							
97298	12.4-12.8	native	99A6825-003.002							
97298	16.4-17.0	native	99A6825-004.002							
97298	17.7-18.2	bedrock	99A6825-005.002							
97298	4.0-4.4	native	99A6825-001.002							
97298	8.4-8.8	native	99A6825-002.002							
97698	11.2-11.6	native	99A8275-003.002							
97698	13.5-13.9	native	99A8275-004.002							
97698	16.3-16.7	native	99A8275-005.002							
97698	18.2-18.8	native	99A8275-008.002							
97698	19.4-19.8	native	99A8275-009.002							
97698	4.6-5.8	native	99A8275-001.002							
97698	8.2-8.6	native	99A8275-002.002							
90998	3.8-4.0	native	98A2015-001.010	B						
91198	11.6-11.9	native	98A1091-001.035	B						
91198	15.5-15.8	native	98A1091-001.036	B						
91198	19.1-19.5	native	98A1091-001.037	B						
91198	19.5-19.8	bedrock	98A1091-001.038	B						
91198	7.7-8.0	native	98A1091-001.034	B						
92598	12.0-12.5	native	98A1092-001.035	B						
92598	16.0-16.75	bedrock	98A1092-001.036	B						
92598	3.5-4.0	native	98A1092-001.033	B						
92598	7.5-8.0	native	98A1092-001.034	B						
97698	11.2-11.6	native	99A8275-003.002	B						
97698	13.5-13.9	native	99A8275-004.002	B						
97698	16.3-16.7	native	99A8275-005.002	B						
97698	18.2-18.8	native	99A8275-008.002	B						
95998	24.6-25.0	bedrock	99A7799-006.002	BJ						
96598	15.2-15.6	native	99A6817-004.002	BJ						
97198	24.4-24.8	bedrock	99A4102-002.018	BJ						
97698	11.2-11.6	native	99A8275-003.002	BJ						
97698	13.5-13.9	native	99A8275-004.002	BJ						
97698	16.3-16.7	native	99A8275-005.002	BJ						
97698	18.2-18.8	native	99A8275-008.002	BJ						
97698	4.6-5.8	native	99A8275-001.002	BJ						
97698	8.2-8.6	native	99A8275-002.002	BJ						
95998	24.6-25.0	bedrock	99A7799-006.002	E						
95998	5.0-5.6	native	99A7799-001.002	E						
97698	11.2-11.6	native	99A8275-003.002	E						

Appendix E  
Real VOC Data

Borehole	Sample Interval	Material	RIN/Event/Bottle	lab_result_qualifier_codes	DICHLORODIFLUORO METHANE (ug/kg)	ETHYLBENZENE (ug/kg)	FREON 113 (ug/kg)	HEXACHLOROBUTADIENE (ug/kg)	ISOPROPYL BENZENE (ug/kg)	ISOPROPYLBENZENE (ug/kg)
97698	13.5-13.9	native	99A8275-004.002	E						
97698	16.3-16.7	native	99A8275-005.002	E						
97698	18.2-18.8	native	99A8275-008.002	E						
90998	3.8-4.0	native	98A2015-001.010	J						
95998	12.4-12.8	native	99A7799-003.002	J						
95998	17.7-18.2	native	99A7799-005.002	J						
95998	24.6-25.0	bedrock	99A7799-006.002	J						
95998	5.0-5.6	native	99A7799-001.002	J						
96198	4.4-4.7	native	99A3210-003.013	J						
96398	12.4-12.7	native	99A4102-001.009	J						
96398	16.2-16.4	bedrock	99A4102-001.012	J						
96398	4.3-4.8	native	99A4102-001.003	J						
96398	8.4-8.9	native	99A4102-001.006	J						
96498	4.8-5.2	native	99A3210-001.013	J						
96598	11.6-12.0	native	99A6817-003.002	J						
96598	22.3-22.7	bedrock	99A6817-006.002	J						
96598	8.4-8.8	native	99A6817-002.002	J				1.6		
96698	12.4-12.8	native	99A6649-003.002	J						
96698	17.7-18.3	native	99A7930-001.002	J						
96698	20.2-20.6	native	99A7930-002.002	J						
96698	22.4-22.8	bedrock	99A7930-003.002	J						
96798	12.5-12.9	native	99A6650-003.002	J						
96798	16.0-16.4	native	99A6650-004.002	J						
96798	20.4-20.8	native	99A6650-005.002	J						
96798	8.4-8.8	native	99A6650-002.002	J						
96898	17.1-17.4	bedrock	99A6307-004.002	J						
96998	4.4-4.8	native	99A6824-001.002	J						
96998	8.4-8.8	native	99A6824-002.002	J						
97098	4.2-4.7	native	99A6308-001.003	J						
97098	8.4-8.8	native	99A6308-002.003	J						
97198	12.4-12.8	native	99A4102-002.009	J						
97198	15.5-16.1	native	99A4102-002.012	J						
97198	4.4-4.8	native	99A4102-002.006	J						
97198	7.3-7.6	native	99A4102-002.003	J						
97298	12.4-12.8	native	99A6825-003.002	J						
97298	4.0-4.4	native	99A6825-001.002	J						
97298	8.4-8.8	native	99A6825-002.002	J						
97698	11.2-11.6	native	99A8275-003.002	J						
97698	13.5-13.9	native	99A8275-004.002	J						
97698	16.3-16.7	native	99A8275-005.002	J						
97698	18.2-18.8	native	99A8275-008.002	J						
97698	19.4-19.8	native	99A8275-009.002	J						
97698	8.2-8.6	native	99A8275-002.002	J						

Appendix E  
Real VOC Data

Borehole	Sample Interval	Material	RIN/Event/Bottle	lab_result_qualifier_codes	DICHLORODIFLUORO METHANE (ug/kg)	ETHYLBENZENE (ug/kg)	FREON 113 (ug/kg)	HEXACHLOROBUTADIENE (ug/kg)	ISOPROPYL BENZENE (ug/kg)	ISOPROPYLBENZENE (ug/kg)
91198	11.6-11.9	native	98A1091-001.035	JB						
91198	15.5-15.8	native	98A1091-001.036	JB						
91198	3.1-3.4	native	98A1091-001.033	JB						
91198	7.7-8.0	native	98A1091-001.034	JB						
92598	12.0-12.5	native	98A1092-001.035	JB						
92598	16.0-16.75	bedrock	98A1092-001.036	JB						
96598	22.3-22.7	bedrock	99A6817-006.002	JB						
96698	12.4-12.8	native	99A6649-003.002	JB						
96698	4.2-4.6	native	99A6649-001.002	JB						
96698	8.2-8.6	native	99A6649-002.002	JB						
96798	12.5-12.9	native	99A6650-003.002	JB						
96798	16.0-16.4	native	99A6650-004.002	JB						
96798	20.4-20.8	native	99A6650-005.002	JB						
96798	4.4-4.8	native	99A6650-001.002	JB						
96798	8.4-8.8	native	99A6650-002.002	JB						
96898	12.3-12.6	native	99A6307-003.002	JB						
96898	17.1-17.4	bedrock	99A6307-004.002	JB						
96898	4.4-4.7	native	99A6307-001.002	JB						
96898	8.4-8.7	native	99A6307-002.002	JB						
96998	12.4-12.7	native	99A6824-003.002	JB						
96998	17.2-17.8	bedrock	99A6824-004.002	JB						
96998	4.4-4.8	native	99A6824-001.002	JB						
96998	8.4-8.8	native	99A6824-002.002	JB						
97098	16.5-17.0	bedrock	99A6308-004.003	JB						
97298	16.4-17.0	native	99A6825-004.002	JB						
97298	17.7-18.2	bedrock	99A6825-005.002	JB						
97698	19.4-19.8	native	99A8275-009.002	JB						
90998	3.8-4.0	native	98A2015-001.010	U	1600	790		790		790
91198	11.6-11.9	native	98A1091-001.035	U	1400	690		690		690
91198	15.5-15.8	native	98A1091-001.036	U	1400	680		680		680
91198	19.1-19.5	native	98A1091-001.037	U	1300	630		630		630
91198	19.5-19.8	bedrock	98A1091-001.038	U	1200	620		620		620
91198	3.1-3.4	native	98A1091-001.033	U	1400	710		710		710
91198	7.7-8.0	native	98A1091-001.034	U	1400	680		680		680
92598	12.0-12.5	native	98A1092-001.035	U	1400	700		700		700
92598	16.0-16.75	bedrock	98A1092-001.036	U	1400	720		720		720
92598	3.5-4.0	native	98A1092-001.033	U	1300	650		650		650
92598	7.5-8.0	native	98A1092-001.034	U	1200	610		610		610
95998	12.4-12.8	native	99A7799-003.002	U	5.8	5.8		5.8	5.8	
95998	14.8-15.2	native	99A7799-004.002	U	5.3	5.3		5.3	5.3	
95998	17.7-18.2	native	99A7799-005.002	U	5.6	5.6		5.6	5.6	
95998	24.6-25.0	bedrock	99A7799-006.002	U	6.3	6.3		6.3	6.3	
95998	5.0-5.6	native	99A7799-001.002	U	5.6	5.6		5.6	5.6	

Appendix E  
Real VOC Data

Borehole	Sample Interval	Material	RIN/Event/Bottle	lab_result_qualifier_codes	DICHLORODIFLUOROMETHANE (ug/kg)	ETHYLBENZENE (ug/kg)	FREON 113 (ug/kg)	HEXACHLOROBUTADIENE (ug/kg)	ISOPROPYL BENZENE (ug/kg)	ISOPROPYLBENZENE (ug/kg)
95998	8.4-8.8	native	99A7799-002.002	U	5.2	5.2		5.2	5.2	
96098	12.5-13.0	native	99A3210-002.015	U	700	700	700	700		700
96098	16.0-16.2	bedrock	99A3210-002.016	U	700	700	700	700		700
96098	4.5-4.8	native	99A3210-002.013	U	730	730	730	730		730
96098	8.5-8.8	native	99A3210-002.014	U	690	690	690	690		690
96198	12.0-12.5	native	99A3210-003.015	U	760	760	760	760		760
96198	15.8-16.2	bedrock	99A3210-003.016	U	700	700	700	700		700
96198	4.4-4.7	native	99A3210-003.013	U	700	700	700	700		700
96198	8.1-8.5	native	99A3210-003.014	U	670	670	670	670		670
96298	12.25-12.75	native	99A3210-004.016	U	750	750	750	750		750
96298	16.1-16.5	bedrock	99A3210-004.017	U	720	720	720	720		720
96298	4.3-4.7	native	99A3210-004.013	U	700	700	700	700		700
96298	8.0-9.0	native	99A3210-004.014	U	670	670	670	670		670
96398	12.4-12.7	native	99A4102-001.009	U	710	710	710	710		710
96398	16.2-16.4	bedrock	99A4102-001.012	U	730	730	730	730		730
96398	4.3-4.8	native	99A4102-001.003	U	700	700	700	700		700
96398	8.4-8.9	native	99A4102-001.006	U	710	710	710	710		710
96498	13-13.5	native	99A3210-001.015	U		1300				
96498	16.0-16.5	native	99A3210-001.016	U		1300				
96498	18.0-18.6	native	99A3210-001.017	U		1300				
96498	22.0-22.5	bedrock	99A3210-001.018	U		1500				
96498	4.8-5.2	native	99A3210-001.013	U		1500				
96498	9.5-10.0	native	99A3210-001.014	U		1300				
96598	11.6-12.0	native	99A6817-003.002	U	5.4	5.4		5.4	5.4	
96598	15.2-15.6	native	99A6817-004.002	U	6	6		6	6	
96598	18.6-18.9	native	99A6817-005.002	U	5.3	5.3		5.3	5.3	
96598	22.3-22.7	bedrock	99A6817-006.002	U	6.2	6.2		6.2	6.2	
96598	4.2-4.6	native	99A6817-001.002	U	5.7	5.7		5.7	5.7	
96598	8.4-8.8	native	99A6817-002.002	U	5.3	5.3		5.3	5.3	
96698	12.4-12.8	native	99A6649-003.002	U	5.9	5.9		5.9	5.9	
96698	17.7-18.3	native	99A7930-001.002	U	5.6	5.6		5.6	5.6	
96698	20.2-20.6	native	99A7930-002.002	U	5.4	5.4		5.4	5.4	
96698	22.4-22.8	bedrock	99A7930-003.002	U	6.4	6.4		6.4	6.4	
96698	4.2-4.6	native	99A6649-001.002	U	5.7	5.7		5.7	5.7	
96698	8.2-8.6	native	99A6649-002.002	U	5.6	5.6		5.6	5.6	
96798	12.5-12.9	native	99A6650-003.002	U	6.2	6.2		6.2	6.2	
96798	16.0-16.4	native	99A6650-004.002	U	7.2	7.2		7.2	7.2	
96798	20.4-20.8	native	99A6650-005.002	U	7.4	7.4		7.4	7.4	
96798	4.4-4.8	native	99A6650-001.002	U	5.3	5.3		5.3	5.3	
96798	8.4-8.8	native	99A6650-002.002	U	6.3	6.3		6.3	6.3	
96898	12.3-12.6	native	99A6307-003.002	U	6.4	6.4		6.4	6.4	
96898	17.1-17.4	bedrock	99A6307-004.002	U	5.3	5.3		5.3	5.3	
96898	4.4-4.7	native	99A6307-001.002	U	5.2	5.2		5.2	5.2	



Appendix E  
Real VOC Data

Borehole	Sample Interval	Material	RIN/Event/Bottle	lab_result_qualifier_codes	DICHLORODIFLUOROMETHANE (ug/kg)	ETHYLBENZENE (ug/kg)	FREON 113 (ug/kg)	HEXACHLOROBUTADIENE (ug/kg)	ISOPROPYL BENZENE (ug/kg)	ISOPROPYLBENZENE (ug/kg)
96898	8.4-8.7	native	99A6307-002.002	U	5.2	5.2		5.2	5.2	
96998	12.4-12.7	native	99A6824-003.002	U	5.6	5.6		5.6	5.6	
96998	17.2-17.8	bedrock	99A6824-004.002	U	5.7	5.7		5.7	5.7	
96998	4.4-4.8	native	99A6824-001.002	U	5.3	5.3		5.3	5.3	
96998	8.4-8.8	native	99A6824-002.002	U	5.2	5.2		5.2	5.2	
97098	12.4-12.6	native	99A6308-003.003	U	5.1	5.1		5.1	5.1	
97098	16.5-17.0	bedrock	99A6308-004.003	U	5.7	5.7		5.7	5.7	
97098	4.2-4.7	native	99A6308-001.003	U	5.5	5.5		5.5	5.5	
97098	8.4-8.8	native	99A6308-002.003	U	5.8	5.8		5.8	5.8	
97198	12.4-12.8	native	99A4102-002.009	U	650	650	650	650	650	650
97198	15.5-16.1	native	99A4102-002.012	U	740	740	740	740	740	740
97198	20.4-20.8	native	99A4102-002.015	U	670	670	670	670	670	670
97198	24.4-24.8	bedrock	99A4102-002.018	U	700	700	700	700	700	700
97198	4.4-4.8	native	99A4102-002.006	U	700	700	700	700	700	700
97198	7.3-7.6	native	99A4102-002.003	U	650	650	650	650	650	650
97298	12.4-12.8	native	99A6825-003.002	U	5.3	5.3		5.3	5.3	
97298	16.4-17.0	native	99A6825-004.002	U	5.4	5.4		5.4	5.4	
97298	17.7-18.2	bedrock	99A6825-005.002	U	6.1	6.1		6.1	6.1	
97298	4.0-4.4	native	99A6825-001.002	U	5.4	5.4		5.4	5.4	
97298	8.4-8.8	native	99A6825-002.002	U	5.7	5.7		5.7	5.7	
97698	11.2-11.6	native	99A8275-003.002	U	5.2	5.2		5.2	5.2	
97698	13.5-13.9	native	99A8275-004.002	U	5.4	5.4		5.4	5.4	
97698	16.3-16.7	native	99A8275-005.002	U	5.3	5.3		5.3	5.3	
97698	18.2-18.8	native	99A8275-008.002	U	5.6	5.6		5.6	5.6	
97698	19.4-19.8	native	99A8275-009.002	U	5.7	5.7		5.7	5.7	
97698	4.6-5.8	native	99A8275-001.002	U	5.3	5.3		5.3	5.3	
97698	8.2-8.6	native	99A8275-002.002	U	5.3	5.3		5.3	5.3	



Appendix E  
Real VOC Data

Borehole	Sample Interval	Material	RIN/Event/Bottle	lab_result_qualifier_codes	M- DICHLORO BENZENE (ug/kg)	METHYL BROMIDE (ug/kg)	METHYL CHLORIDE (ug/kg)	METHYLENE CHLORIDE (ug/kg)	N-BUTYL BENZENE (ug/kg)	N-PROPYL BENZENE (ug/kg)
90998	3.8-4.0	native	98A2015-001.010							
91198	11.6-11.9	native	98A1091-001.035							
91198	15.5-15.8	native	98A1091-001.036							
91198	19.1-19.5	native	98A1091-001.037							
91198	19.5-19.8	bedrock	98A1091-001.038							
91198	3.1-3.4	native	98A1091-001.033							
91198	7.7-8.0	native	98A1091-001.034							
92598	12.0-12.5	native	98A1092-001.035							
92598	16.0-16.75	bedrock	98A1092-001.036							
92598	3.5-4.0	native	98A1092-001.033							
92598	7.5-8.0	native	98A1092-001.034							
95998	12.4-12.8	native	99A7799-003.002							
95998	14.8-15.2	native	99A7799-004.002							
95998	17.7-18.2	native	99A7799-005.002							
95998	24.6-25.0	bedrock	99A7799-006.002							
95998	5.0-5.6	native	99A7799-001.002							
95998	8.4-8.8	native	99A7799-002.002							
96298	16.1-16.5	bedrock	99A3210-004.017							
96498	13-13.5	native	99A3210-001.015							
96498	16.0-16.5	native	99A3210-001.016							
96498	18.0-18.6	native	99A3210-001.017							
96498	22.0-22.5	bedrock	99A3210-001.018							
96498	4.8-5.2	native	99A3210-001.013							
96498	9.5-10.0	native	99A3210-001.014							
96598	11.6-12.0	native	99A6817-003.002							
96598	15.2-15.6	native	99A6817-004.002							
96598	18.6-18.9	native	99A6817-005.002							
96598	22.3-22.7	bedrock	99A6817-006.002							
96598	4.2-4.6	native	99A6817-001.002							
96598	8.4-8.8	native	99A6817-002.002							
96698	12.4-12.8	native	99A6649-003.002							
96698	17.7-18.3	native	99A7930-001.002							
96698	20.2-20.6	native	99A7930-002.002							
96698	22.4-22.8	bedrock	99A7930-003.002							
96698	4.2-4.6	native	99A6649-001.002							
96698	8.2-8.6	native	99A6649-002.002							
96798	12.5-12.9	native	99A6650-003.002							
96798	16.0-16.4	native	99A6650-004.002							
96798	20.4-20.8	native	99A6650-005.002							
96798	8.4-8.8	native	99A6650-002.002							
96898	12.3-12.6	native	99A6307-003.002							
96898	17.1-17.4	bedrock	99A6307-004.002							
96898	4.4-4.7	native	99A6307-001.002							

Appendix E  
Real VOC Data

Borehole	Sample Interval	Material	RIN/Event/Bottle	lab_result_qualifier_codes	M- DICHLOROBENZENE (ug/kg)	METHYL BROMIDE (ug/kg)	METHYL CHLORIDE (ug/kg)	METHYLENE CHLORIDE (ug/kg)	N-BUTYL BENZENE (ug/kg)	N-PROPYL BENZENE (ug/kg)
96898	8.4-8.7	native	99A6307-002.002							
96998	4.4-4.8	native	99A6824-001.002							
96998	8.4-8.8	native	99A6824-002.002							
97198	20.4-20.8	native	99A4102-002.015							
97198	24.4-24.8	bedrock	99A4102-002.018							
97298	12.4-12.8	native	99A6825-003.002							
97298	16.4-17.0	native	99A6825-004.002							
97298	17.7-18.2	bedrock	99A6825-005.002							
97298	4.0-4.4	native	99A6825-001.002							
97298	8.4-8.8	native	99A6825-002.002							
97698	11.2-11.6	native	99A8275-003.002							
97698	13.5-13.9	native	99A8275-004.002							
97698	16.3-16.7	native	99A8275-005.002							
97698	18.2-18.8	native	99A8275-008.002							
97698	19.4-19.8	native	99A8275-009.002							
97698	4.6-5.8	native	99A8275-001.002							
97698	8.2-8.6	native	99A8275-002.002							
90998	3.8-4.0	native	99A2015-001.010	B				830		
91198	11.6-11.9	native	98A1091-001.035	B				960		
91198	15.5-15.8	native	98A1091-001.036	B				980		
91198	19.1-19.5	native	98A1091-001.037	B				1500		
91198	19.5-19.8	bedrock	98A1091-001.038	B				1200		
91198	7.7-8.0	native	98A1091-001.034	B				910		
92598	12.0-12.5	native	98A1092-001.035	B				1700		
92598	16.0-16.75	bedrock	98A1092-001.036	B				1700		
92598	3.5-4.0	native	98A1092-001.033	B				1400		
92598	7.5-8.0	native	98A1092-001.034	B				1500		
97698	11.2-11.6	native	99A8275-003.002	B				28.6		
97698	13.5-13.9	native	99A8275-004.002	B				35.4		
97698	16.3-16.7	native	99A8275-005.002	B				29.9		
97698	18.2-18.8	native	99A8275-008.002	B				21.6		
95998	24.6-25.0	bedrock	99A7799-006.002	BJ				0.83		
96598	15.2-15.6	native	99A6817-004.002	BJ				1.7		
97198	24.4-24.8	bedrock	99A4102-002.018	BJ				460		
97698	11.2-11.6	native	99A8275-003.002	BJ						
97698	13.5-13.9	native	99A8275-004.002	BJ						
97698	16.3-16.7	native	99A8275-005.002	BJ						
97698	18.2-18.8	native	99A8275-008.002	BJ						
97698	4.6-5.8	native	99A8275-001.002	BJ						
97698	8.2-8.6	native	99A8275-002.002	BJ						
95998	24.6-25.0	bedrock	99A7799-006.002	E						
95998	5.0-5.6	native	99A7799-001.002	E						
97698	11.2-11.6	native	99A8275-003.002	E						

Appendix E  
Real VOC Data

Borehole	Sample Interval	Material	RIN/Event/Bottle	lab_result_qualifier_codes	M- DICHLORO BENZENE (ug/kg)	METHYL BROMIDE (ug/kg)	METHYL CHLORIDE (ug/kg)	METHYLENE CHLORIDE (ug/kg)	N-BUTYL BENZENE (ug/kg)	N-PROPYL BENZENE (ug/kg)
97698	13.5-13.9	native	99A8275-004.002	E						
97698	16.3-16.7	native	99A8275-005.002	E						
97698	18.2-18.8	native	99A8275-008.002	E						
90998	3.8-4.0	native	98A2015-001.010	J						
95998	12.4-12.8	native	99A7799-003.002	J						
95998	17.7-18.2	native	99A7799-005.002	J						
95998	24.6-25.0	bedrock	99A7799-006.002	J	0.94				0.66	
95998	5.0-5.6	native	99A7799-001.002	J	0.72				0.62	
96198	4.4-4.7	native	99A3210-003.013	J						
96398	12.4-12.7	native	99A4102-001.009	J				410		
96398	16.2-16.4	bedrock	99A4102-001.012	J				390		
96398	4.3-4.8	native	99A4102-001.003	J				380		
96398	8.4-8.9	native	99A4102-001.006	J				350		
96498	4.8-5.2	native	99A3210-001.013	J						
96598	11.6-12.0	native	99A6817-003.002	J						
96598	22.3-22.7	bedrock	99A6817-006.002	J				4.2		
96598	8.4-8.8	native	99A6817-002.002	J	0.63					
96698	12.4-12.8	native	99A6649-003.002	J						
96698	17.7-18.3	native	99A7930-001.002	J				1.4		
96698	20.2-20.6	native	99A7930-002.002	J				1.8		
96698	22.4-22.8	bedrock	99A7930-003.002	J				2		
96798	12.5-12.9	native	99A6650-003.002	J				2.8		
96798	16.0-16.4	native	99A6650-004.002	J				3.1		
96798	20.4-20.8	native	99A6650-005.002	J				1.1		
96798	8.4-8.8	native	99A6650-002.002	J				0.68		
96898	17.1-17.4	bedrock	99A6307-004.002	J						
96998	4.4-4.8	native	99A6824-001.002	J				1.5		
96998	8.4-8.8	native	99A6824-002.002	J				0.64		
97098	4.2-4.7	native	99A6308-001.003	J						
97098	8.4-8.8	native	99A6308-002.003	J				0.59		
97198	12.4-12.8	native	99A4102-002.009	J						
97198	15.5-16.1	native	99A4102-002.012	J						
97198	4.4-4.8	native	99A4102-002.006	J						
97198	7.3-7.6	native	99A4102-002.003	J						
97298	12.4-12.8	native	99A6825-003.002	J						
97298	4.0-4.4	native	99A6825-001.002	J				200		
97298	8.4-8.8	native	99A6825-002.002	J				380		
97698	11.2-11.6	native	99A8275-003.002	J				1.5		
97698	13.5-13.9	native	99A8275-004.002	J				0.9		
97698	16.3-16.7	native	99A8275-005.002	J				1.3		
97698	18.2-18.8	native	99A8275-008.002	J						
97698	19.4-19.8	native	99A8275-009.002	J						
97698	8.2-8.6	native	99A8275-002.002	J						

Appendix E  
Real VOC Data

Borehole	Sample Interval	Material	RIN/Event/Bottle	lab_result_qualifier_codes	M-DICHLORO BENZENE (ug/kg)	METHYL BROMIDE (ug/kg)	METHYL CHLORIDE (ug/kg)	METHYLENE CHLORIDE (ug/kg)	N-BUTYL BENZENE (ug/kg)	N-PROPYL BENZENE (ug/kg)
91198	11.6-11.9	native	98A1091-001.035	JB						
91198	15.5-15.8	native	98A1091-001.036	JB						
91198	3.1-3.4	native	98A1091-001.033	JB				470		
91198	7.7-8.0	native	98A1091-001.034	JB						
92598	12.0-12.5	native	98A1092-001.035	JB						
92598	16.0-16.75	bedrock	98A1092-001.036	JB						
96598	22.3-22.7	bedrock	99A6817-006.002	JB						
96698	12.4-12.8	native	99A6649-003.002	JB						
96698	4.2-4.6	native	99A6649-001.002	JB						
96698	8.2-8.6	native	99A6649-002.002	JB						
96798	12.5-12.9	native	99A6650-003.002	JB						
96798	16.0-16.4	native	99A6650-004.002	JB						
96798	20.4-20.8	native	99A6650-005.002	JB						
96798	4.4-4.8	native	99A6650-001.002	JB						
96798	8.4-8.8	native	99A6650-002.002	JB						
96898	12.3-12.6	native	99A6307-003.002	JB				1.1		
96898	17.1-17.4	bedrock	99A6307-004.002	JB				1.4		
96898	4.4-4.7	native	99A6307-001.002	JB				1.1		
96898	8.4-8.7	native	99A6307-002.002	JB				0.89		
96998	12.4-12.7	native	99A6824-003.002	JB						
96998	17.2-17.8	bedrock	99A6824-004.002	JB						
96998	4.4-4.8	native	99A6824-001.002	JB						
96998	8.4-8.8	native	99A6824-002.002	JB						
97098	16.5-17.0	bedrock	99A6308-004.003	JB						
97298	16.4-17.0	native	99A6825-004.002	JB						
97298	17.7-18.2	bedrock	99A6825-005.002	JB						
97698	19.4-19.8	native	99A8275-009.002	JB				2.3		
90998	3.8-4.0	native	98A2015-001.010	U					790	790
91198	11.6-11.9	native	98A1091-001.035	U					690	690
91198	15.5-15.8	native	98A1091-001.036	U					680	680
91198	19.1-19.5	native	98A1091-001.037	U					630	630
91198	19.5-19.8	bedrock	98A1091-001.038	U					620	620
91198	3.1-3.4	native	98A1091-001.033	U					710	710
91198	7.7-8.0	native	98A1091-001.034	U					680	680
92598	12.0-12.5	native	98A1092-001.035	U					700	700
92598	16.0-16.75	bedrock	98A1092-001.036	U					720	720
92598	3.5-4.0	native	98A1092-001.033	U					650	650
92598	7.5-8.0	native	98A1092-001.034	U					610	610
95998	12.4-12.8	native	99A7799-003.002	U	5.8	5.8	5.8	5.8	5.8	5.8
95998	14.8-15.2	native	99A7799-004.002	U	5.3	5.3	5.3	5.3	5.3	5.3
95998	17.7-18.2	native	99A7799-005.002	U	5.6	5.6	5.6	5.6	5.6	5.6
95998	24.6-25.0	bedrock	99A7799-006.002	U		6.3	6.3			6.3
95998	5.0-5.6	native	99A7799-001.002	U		5.6	5.6	5.6		5.6

Appendix E  
Real VOC Data

Borehole	Sample Interval	Material	RIN/Event/Bottle	lab_result_qualifier_codes	M- DICHLOROBENZENE (ug/kg)	METHYL BROMIDE (ug/kg)	METHYL CHLORIDE (ug/kg)	METHYLENE CHLORIDE (ug/kg)	N-BUTYLBENZENE (ug/kg)	N-PROPYLBENZENE (ug/kg)
95998	8.4-8.8	native	99A7799-002.002	U	5.2	5.2	5.2	5.2	5.2	5.2
96098	12.5-13.0	native	99A3210-002.015	U				700	700	700
96098	16.0-16.2	bedrock	99A3210-002.016	U				700	700	700
96098	4.5-4.8	native	99A3210-002.013	U				730	730	730
96098	8.5-8.8	native	99A3210-002.014	U				690	690	690
96198	12.0-12.5	native	99A3210-003.015	U				760	760	760
96198	15.8-16.2	bedrock	99A3210-003.016	U				700	700	700
96198	4.4-4.7	native	99A3210-003.013	U				670	670	670
96198	8.1-8.5	native	99A3210-003.014	U				750	750	750
96298	12.25-12.75	native	99A3210-004.016	U				720	720	720
96298	16.1-16.5	bedrock	99A3210-004.017	U				700	700	700
96298	4.3-4.7	native	99A3210-004.013	U				670	670	670
96298	8.0-9.0	native	99A3210-004.014	U				670	670	670
96398	12.4-12.7	native	99A4102-001.009	U					710	710
96398	16.2-16.4	bedrock	99A4102-001.012	U					730	730
96398	4.3-4.8	native	99A4102-001.003	U					700	700
96398	8.4-8.9	native	99A4102-001.006	U					710	710
96498	13-13.5	native	99A3210-001.015	U				1300		
96498	16.0-16.5	native	99A3210-001.016	U				1300		
96498	18.0-18.6	native	99A3210-001.017	U				1300		
96498	22.0-22.5	bedrock	99A3210-001.018	U				1500		
96498	4.8-5.2	native	99A3210-001.013	U				1500		
96498	9.5-10.0	native	99A3210-001.014	U				1300		
96598	11.6-12.0	native	99A6817-003.002	U	5.4	5.4	5.4	5.4	5.4	5.4
96598	15.2-15.6	native	99A6817-004.002	U	6	6	6	6	6	6
96598	18.6-18.9	native	99A6817-005.002	U	5.3	5.3	5.3	5.3	5.3	5.3
96598	22.3-22.7	bedrock	99A6817-006.002	U	6.2	6.2	6.2	6.2	6.2	6.2
96598	4.2-4.6	native	99A6817-001.002	U	5.7	5.7	5.7	5.7	5.7	5.7
96598	8.4-8.8	native	99A6817-002.002	U				5.3	5.3	5.3
96598	12.4-12.8	native	99A6649-003.002	U	5.9	5.9	5.9	5.9	5.9	5.9
96698	17.7-18.3	native	99A7930-001.002	U	5.6	5.6	5.6	5.6	5.6	5.6
96698	20.2-20.6	native	99A7930-002.002	U	5.4	5.4	5.4	5.4	5.4	5.4
96698	22.4-22.8	bedrock	99A7930-003.002	U	6.4	6.4	6.4	6.4	6.4	6.4
96698	4.2-4.6	native	99A6649-001.002	U	5.7	5.7	5.7	5.7	5.7	5.7
96698	8.2-8.6	native	99A6649-002.002	U	5.6	5.6	5.6	5.6	5.6	5.6
96798	12.5-12.9	native	99A6650-003.002	U	6.2	6.2	6.2	6.2	6.2	6.2
96798	16.0-16.4	native	99A6650-004.002	U	7.2	7.2	7.2	7.2	7.2	7.2
96798	20.4-20.8	native	99A6650-005.002	U	7.4	7.4	7.4	7.4	7.4	7.4
96798	4.4-4.8	native	99A6650-001.002	U	5.3	5.3	5.3	5.3	5.3	5.3
96798	8.4-8.8	native	99A6650-002.002	U	6.3	6.3	6.3	6.3	6.3	6.3
96898	12.3-12.6	native	99A6307-003.002	U	6.4	6.4	6.4	6.4	6.4	6.4
96898	17.1-17.4	bedrock	99A6307-004.002	U	5.3	5.3	5.3	5.3	5.3	5.3
96898	4.4-4.7	native	99A6307-001.002	U	5.2	5.2	5.2	5.2	5.2	5.2

Appendix E  
Real VOC Data

Borehole	Sample Interval	Material	RIN/Event/Bottle	lab_result_qualifier_codes	M-DICHLORO BENZENE (ug/kg)	METHYL BROMIDE (ug/kg)	METHYL CHLORIDE (ug/kg)	METHYLENE CHLORIDE (ug/kg)	N-BUTYL BENZENE (ug/kg)	N-PROPYL BENZENE (ug/kg)
96898	8.4-8.7	native	99A6307-002.002	U	5.2	5.2	5.2	5.2	5.2	5.2
96998	12.4-12.7	native	99A6824-003.002	U	5.6	5.6	5.6	5.6	5.6	5.6
96998	17.2-17.8	bedrock	99A6824-004.002	U	5.7	5.7	5.7	5.7	5.7	5.7
96998	4.4-4.8	native	99A6824-001.002	U	5.3	5.3	5.3	5.3	5.3	5.3
96998	8.4-8.8	native	99A6824-002.002	U	5.2	5.2	5.2	5.2	5.2	5.2
97098	12.4-12.6	native	99A6308-003.003	U	5.1	5.1	5.1	5.1	5.1	5.1
97098	16.5-17.0	bedrock	99A6308-004.003	U	5.7	5.7	5.7	5.7	5.7	5.7
97098	4.2-4.7	native	99A6308-001.003	U	5.5	5.5	5.5	5.5	5.5	5.5
97098	8.4-8.8	native	99A6308-002.003	U	5.8	5.8	5.8	5.8	5.8	5.8
97198	12.4-12.8	native	99A4102-002.009	U				650	650	650
97198	15.5-16.1	native	99A4102-002.012	U				740	740	740
97198	20.4-20.8	native	99A4102-002.015	U				670	670	670
97198	24.4-24.8	bedrock	99A4102-002.018	U				700	700	700
97198	4.4-4.8	native	99A4102-002.006	U				700	700	700
97198	7.3-7.6	native	99A4102-002.003	U				650	650	650
97298	12.4-12.8	native	99A6825-003.002	U	5.3	5.3	5.3	5.3	5.3	5.3
97298	16.4-17.0	native	99A6825-004.002	U	5.4	5.4	5.4	5.4	5.4	5.4
97298	17.7-18.2	bedrock	99A6825-005.002	U	6.1	6.1	6.1	6.1	6.1	6.1
97298	4.0-4.4	native	99A6825-001.002	U	5.4	5.4	5.4	5.4	5.4	5.4
97298	8.4-8.8	native	99A6825-002.002	U	5.7	5.7	5.7	5.7	5.7	5.7
97698	11.2-11.6	native	99A8275-003.002	U	5.2	5.2	5.2	5.2	5.2	5.2
97698	13.5-13.9	native	99A8275-004.002	U	5.4	5.4	5.4	5.4	5.4	5.4
97698	16.3-16.7	native	99A8275-005.002	U	5.3	5.3	5.3	5.3	5.3	5.3
97698	18.2-18.8	native	99A8275-008.002	U	5.6	5.6	5.6	5.6	5.6	5.6
97698	19.4-19.8	native	99A8275-009.002	U	5.7	5.7	5.7	5.7	5.7	5.7
97698	4.6-5.8	native	99A8275-001.002	U	5.3	5.3	5.3	5.3	5.3	5.3
97698	8.2-8.6	native	99A8275-002.002	U	5.3	5.3	5.3	5.3	5.3	5.3

Appendix E  
Real VOC Data

Borehole	Sample Interval	Material	RIN/Event/Bottle	lab_result_qualifier_codes	NAPHTHALENE (ug/kg)	O-DICHLORO BENZENE (ug/kg)	P-DICHLORO BENZENE (ug/kg)	SEC-BUTYL BENZENE (ug/kg)	STYRENE (ug/kg)	TERT-BUTYL BENZENE (ug/kg)
90998	3.8-4.0	native	98A2015-001.010							
91198	11.6-11.9	native	98A1091-001.035							
91198	15.5-15.8	native	98A1091-001.036							
91198	19.1-19.5	native	98A1091-001.037							
91198	19.5-19.8	bedrock	98A1091-001.038							
91198	3.1-3.4	native	98A1091-001.033							
91198	7.7-8.0	native	98A1091-001.034							
92598	12.0-12.5	native	98A1092-001.035							
92598	16.0-16.75	bedrock	98A1092-001.036							
92598	3.5-4.0	native	98A1092-001.033							
92598	7.5-8.0	native	98A1092-001.034							
95998	12.4-12.8	native	99A7799-003.002							
95998	14.8-15.2	native	99A7799-004.002							
95998	17.7-18.2	native	99A7799-005.002							
95998	24.6-25.0	bedrock	99A7799-006.002							
95998	5.0-5.6	native	99A7799-001.002							
95998	8.4-8.8	native	99A7799-002.002							
96298	16.1-16.5	bedrock	99A3210-004.017							
96498	13-13.5	native	99A3210-001.015							
96498	16.0-16.5	native	99A3210-001.016							
96498	18.0-18.6	native	99A3210-001.017							
96498	22.0-22.5	bedrock	99A3210-001.018							
96498	4.8-5.2	native	99A3210-001.013							
96498	9.5-10.0	native	99A3210-001.014							
96598	11.6-12.0	native	99A6817-003.002							
96598	15.2-15.6	native	99A6817-004.002							
96598	18.6-18.9	native	99A6817-005.002							
96598	22.3-22.7	bedrock	99A6817-006.002							
96598	4.2-4.6	native	99A6817-001.002							
96598	8.4-8.8	native	99A6817-002.002							
96698	12.4-12.8	native	99A6649-003.002							
96698	17.7-18.3	native	99A7930-001.002							
96698	20.2-20.6	native	99A7930-002.002							
96698	22.4-22.8	bedrock	99A7930-003.002							
96698	4.2-4.6	native	99A6649-001.002							
96698	8.2-8.6	native	99A6649-002.002							
96798	12.5-12.9	native	99A6650-003.002							
96798	16.0-16.4	native	99A6650-004.002							
96798	20.4-20.8	native	99A6650-005.002							
96798	8.4-8.8	native	99A6650-002.002							
96898	12.3-12.6	native	99A6307-003.002							
96898	17.1-17.4	bedrock	99A6307-004.002							
96898	4.4-4.7	native	99A6307-001.002							



Appendix E  
Real VOC Data

Borehole	Sample Interval	Material	RIN/Event/Bottle	lab_result_qualifier_codes	NAPHTHALENE (ug/kg)	O-DICHLORO BENZENE (ug/kg)	P-DICHLORO BENZENE (ug/kg)	SEC-BUTYL BENZENE (ug/kg)	STYRENE (ug/kg)	TERT-BUTYL BENZENE (ug/kg)
96898	8.4-8.7	native	99A6307-002.002							
96998	4.4-4.8	native	99A6824-001.002							
96998	8.4-8.8	native	99A6824-002.002							
97198	20.4-20.8	native	99A4102-002.015							
97198	24.4-24.8	bedrock	99A4102-002.018							
97298	12.4-12.8	native	99A6825-003.002							
97298	16.4-17.0	native	99A6825-004.002							
97298	17.7-18.2	bedrock	99A6825-005.002							
97298	4.0-4.4	native	99A6825-001.002							
97298	8.4-8.8	native	99A6825-002.002							
97698	11.2-11.6	native	99A8275-003.002							
97698	13.5-13.9	native	99A8275-004.002							
97698	16.3-16.7	native	99A8275-005.002							
97698	18.2-18.8	native	99A8275-008.002							
97698	19.4-19.8	native	99A8275-009.002							
97698	4.6-5.8	native	99A8275-001.002							
97698	8.2-8.6	native	99A8275-002.002							
90998	3.8-4.0	native	98A2015-001.010	B						
91198	11.6-11.9	native	98A1091-001.035	B						
91198	15.5-15.8	native	98A1091-001.036	B						
91198	19.1-19.5	native	98A1091-001.037	B						
91198	19.5-19.8	bedrock	98A1091-001.038	B						
91198	7.7-8.0	native	98A1091-001.034	B						
92598	12.0-12.5	native	98A1092-001.035	B						
92598	16.0-16.75	bedrock	98A1092-001.036	B						
92598	3.5-4.0	native	98A1092-001.033	B						
92598	7.5-8.0	native	98A1092-001.034	B						
97698	11.2-11.6	native	99A8275-003.002	B						
97698	13.5-13.9	native	99A8275-004.002	B						
97698	16.3-16.7	native	99A8275-005.002	B						
97698	18.2-18.8	native	99A8275-008.002	B						
95998	24.6-25.0	bedrock	99A7799-006.002	BJ						
96598	15.2-15.6	native	99A6817-004.002	BJ						
97198	24.4-24.8	bedrock	99A4102-002.018	BJ						
97698	11.2-11.6	native	99A8275-003.002	BJ						
97698	13.5-13.9	native	99A8275-004.002	BJ						
97698	16.3-16.7	native	99A8275-005.002	BJ						
97698	18.2-18.8	native	99A8275-008.002	BJ						
97698	4.6-5.8	native	99A8275-001.002	BJ						
97698	8.2-8.6	native	99A8275-002.002	BJ						
95998	24.6-25.0	bedrock	99A7799-006.002	E						
95998	5.0-5.6	native	99A7799-001.002	E						
97698	11.2-11.6	native	99A8275-003.002	E						



Appendix E  
Real VOC Data

Borehole	Sample Interval	Material	RIN/Event/Bottle	lab_result_qualifier_codes	NAPHTHALENE (ug/kg)	O-DICHLORO BENZENE (ug/kg)	P-DICHLORO BENZENE (ug/kg)	SEC-BUTYL BENZENE (ug/kg)	STYRENE (ug/kg)	TERT-BUTYL BENZENE (ug/kg)
97698	13.5-13.9	native	99A8275-004.002	E						
97698	16.3-16.7	native	99A8275-005.002	E						
97698	18.2-18.8	native	99A8275-008.002	E						
90998	3.8-4.0	native	98A2015-001.010	J						
95998	12.4-12.8	native	99A7799-003.002	J						
95998	17.7-18.2	native	99A7799-005.002	J						
95998	24.6-25.0	bedrock	99A7799-006.002	J						
95998	5.0-5.6	native	99A7799-001.002	J	2.4	0.73	1.2			
96198	4.4-4.7	native	99A3210-003.013	J	2.1	0.64	0.87			
96398	12.4-12.7	native	99A4102-001.009	J	190					
96398	16.2-16.4	bedrock	99A4102-001.012	J						
96398	4.3-4.8	native	99A4102-001.003	J						
96398	8.4-8.9	native	99A4102-001.006	J						
96498	4.8-5.2	native	99A3210-001.013	J						
96598	11.6-12.0	native	99A6817-003.002	J	0.68					
96598	22.3-22.7	bedrock	99A6817-006.002	J						
96598	8.4-8.8	native	99A6817-002.002	J	1.7	0.65	0.86			
96698	12.4-12.8	native	99A6649-003.002	J						
96698	17.7-18.3	native	99A7930-001.002	J						
96698	20.2-20.6	native	99A7930-002.002	J						
96698	22.4-22.8	bedrock	99A7930-003.002	J						
96798	12.5-12.9	native	99A6650-003.002	J						
96798	16.0-16.4	native	99A6650-004.002	J						
96798	20.4-20.8	native	99A6650-005.002	J						
96798	8.4-8.8	native	99A6650-002.002	J	0.68					
96898	17.1-17.4	bedrock	99A6307-004.002	J						
96998	4.4-4.8	native	99A6824-001.002	J						
96998	8.4-8.8	native	99A6824-002.002	J						
97098	4.2-4.7	native	99A6308-001.003	J						
97098	8.4-8.8	native	99A6308-002.003	J						
97198	12.4-12.8	native	99A4102-002.009	J	1400					
97198	15.5-16.1	native	99A4102-002.012	J	1500					
97198	4.4-4.8	native	99A4102-002.006	J	1400					
97198	7.3-7.6	native	99A4102-002.003	J	1200					
97298	12.4-12.8	native	99A6825-003.002	J						
97298	4.0-4.4	native	99A6825-001.002	J						
97298	8.4-8.8	native	99A6825-002.002	J						
97698	11.2-11.6	native	99A8275-003.002	J						
97698	13.5-13.9	native	99A8275-004.002	J						
97698	16.3-16.7	native	99A8275-005.002	J						
97698	18.2-18.8	native	99A8275-008.002	J						
97698	19.4-19.8	native	99A8275-009.002	J						
97698	8.2-8.6	native	99A8275-002.002	J						

Appendix E  
Real VOC Data

Borehole	Sample Interval	Material	RIN/Event/Bottle	lab_result_qualifier_codes	NAPHTHALENE (ug/kg)	O-DICHLORO BENZENE (ug/kg)	P-DICHLORO BENZENE (ug/kg)	SEC-BUTYL BENZENE (ug/kg)	STYRENE (ug/kg)	TERT-BUTYL BENZENE (ug/kg)
91198	11.6-11.9	native	98A1091-001.035	JB						
91198	15.5-15.8	native	98A1091-001.036	JB						
91198	3.1-3.4	native	98A1091-001.033	JB						
91198	7.7-8.0	native	98A1091-001.034	JB						
92598	12.0-12.5	native	98A1092-001.035	JB						
92598	16.0-16.75	bedrock	98A1092-001.036	JB						
96598	22.3-22.7	bedrock	99A6817-006.002	JB						
96698	12.4-12.8	native	99A6649-003.002	JB						
96698	4.2-4.6	native	99A6649-001.002	JB						
96698	8.2-8.6	native	99A6649-002.002	JB						
96798	12.5-12.9	native	99A6650-003.002	JB						
96798	16.0-16.4	native	99A6650-004.002	JB						
96798	20.4-20.8	native	99A6650-005.002	JB						
96798	4.4-4.8	native	99A6650-001.002	JB						
96798	8.4-8.8	native	99A6650-002.002	JB						
96898	12.3-12.6	native	99A6307-003.002	JB						
96898	17.1-17.4	bedrock	99A6307-004.002	JB						
96898	4.4-4.7	native	99A6307-001.002	JB						
96898	8.4-8.7	native	99A6307-002.002	JB						
96998	12.4-12.7	native	99A6824-003.002	JB						
96998	17.2-17.8	bedrock	99A6824-004.002	JB						
96998	4.4-4.8	native	99A6824-001.002	JB						
96998	8.4-8.8	native	99A6824-002.002	JB						
97098	16.5-17.0	bedrock	99A6308-004.003	JB						
97298	16.4-17.0	native	99A6825-004.002	JB						
97298	17.7-18.2	bedrock	99A6825-005.002	JB						
97698	19.4-19.8	native	99A8275-009.002	JB						
90998	3.8-4.0	native	98A2015-001.010	U	790			790	790	790
91198	11.6-11.9	native	98A1091-001.035	U	690			690	690	690
91198	15.5-15.8	native	98A1091-001.036	U	680			680	680	680
91198	19.1-19.5	native	98A1091-001.037	U	630			630	630	630
91198	19.5-19.8	bedrock	98A1091-001.038	U	620			620	620	620
91198	3.1-3.4	native	98A1091-001.033	U	710			710	710	710
91198	7.7-8.0	native	98A1091-001.034	U	680			680	680	680
92598	12.0-12.5	native	98A1092-001.035	U	700			700	700	700
92598	16.0-16.75	bedrock	98A1092-001.036	U	720			720	720	720
92598	3.5-4.0	native	98A1092-001.033	U	650			650	650	650
92598	7.5-8.0	native	98A1092-001.034	U	610			610	610	610
95998	12.4-12.8	native	99A7799-003.002	U	5.8	5.8	5.8	5.8	5.8	5.8
95998	14.8-15.2	native	99A7799-004.002	U	5.3	5.3	5.3	5.3	5.3	5.3
95998	17.7-18.2	native	99A7799-005.002	U	5.6	5.6	5.6	5.6	5.6	5.6
95998	24.6-25.0	bedrock	99A7799-006.002	U				6.3	6.3	6.3
95998	5.0-5.6	native	99A7799-001.002	U				5.6	5.6	5.6

Appendix E  
Real VOC Data

Borehole	Sample Interval	Material	RIN/Event/Bottle	lab_result_qualifier_codes	NAPHTHALENE (ug/kg)	O-DICHLORO BENZENE (ug/kg)	P-DICHLORO BENZENE (ug/kg)	SEC-BUTYL BENZENE (ug/kg)	STYRENE (ug/kg)	TERT-BUTYL BENZENE (ug/kg)
95998	8.4-8.8	native	99A7799-002.002	U	5.2	5.2	5.2	5.2	5.2	5.2
96098	12.5-13.0	native	99A3210-002.015	U	700			700	700	700
96098	16.0-16.2	bedrock	99A3210-002.016	U	700			700	700	700
96098	4.5-4.8	native	99A3210-002.013	U	730			730	730	730
96098	8.5-8.8	native	99A3210-002.014	U	690			690	690	690
96198	12.0-12.5	native	99A3210-003.015	U	760			760	760	760
96198	15.8-16.2	bedrock	99A3210-003.016	U	700			700	700	700
96198	4.4-4.7	native	99A3210-003.013	U	670			700	700	700
96198	8.1-8.5	native	99A3210-003.014	U	670			670	670	670
96298	12.25-12.75	native	99A3210-004.016	U	750			750	750	750
96298	16.1-16.5	bedrock	99A3210-004.017	U	720			720	720	720
96298	4.3-4.7	native	99A3210-004.013	U	700			700	700	700
96298	8.0-9.0	native	99A3210-004.014	U	670			670	670	670
96398	12.4-12.7	native	99A4102-001.009	U	710			710	710	710
96398	16.2-16.4	bedrock	99A4102-001.012	U	730			730	730	730
96398	4.3-4.8	native	99A4102-001.003	U	700			700	700	700
96398	8.4-8.9	native	99A4102-001.006	U	710			710	710	710
96498	13-13.5	native	99A3210-001.015	U					1300	
96498	16.0-16.5	native	99A3210-001.016	U					1300	
96498	18.0-18.6	native	99A3210-001.017	U					1300	
96498	22.0-22.5	bedrock	99A3210-001.018	U					1500	
96498	4.8-5.2	native	99A3210-001.013	U					1500	
96498	9.5-10.0	native	99A3210-001.014	U					1300	
96598	11.6-12.0	native	99A6817-003.002	U	5.4	5.4	5.4	5.4	5.4	5.4
96598	15.2-15.6	native	99A6817-004.002	U	6	6	6	6	6	6
96598	18.6-18.9	native	99A6817-005.002	U	5.3	5.3	5.3	5.3	5.3	5.3
96598	22.3-22.7	bedrock	99A6817-006.002	U	6.2	6.2	6.2	6.2	6.2	6.2
96598	4.2-4.6	native	99A6817-001.002	U	5.7	5.7	5.7	5.7	5.7	5.7
96598	8.4-8.8	native	99A6817-002.002	U					5.3	5.3
96698	12.4-12.8	native	99A6649-003.002	U	5.9	5.9	5.9	5.9	5.9	5.9
96698	17.7-18.3	native	99A7930-001.002	U	5.6	5.6	5.6	5.6	5.6	5.6
96698	20.2-20.6	native	99A7930-002.002	U	5.4	5.4	5.4	5.4	5.4	5.4
96698	22.4-22.8	bedrock	99A7930-003.002	U	6.4	6.4	6.4	6.4	6.4	6.4
96698	4.2-4.6	native	99A6649-001.002	U	5.7	5.7	5.7	5.7	5.7	5.7
96698	8.2-8.6	native	99A6649-002.002	U	5.6	5.6	5.6	5.6	5.6	5.6
96798	12.5-12.9	native	99A6650-003.002	U	6.2	6.2	6.2	6.2	6.2	6.2
96798	16.0-16.4	native	99A6650-004.002	U	7.2	7.2	7.2	7.2	7.2	7.2
96798	20.4-20.8	native	99A6650-005.002	U	7.4	7.4	7.4	7.4	7.4	7.4
96798	4.4-4.8	native	99A6650-001.002	U	5.3	5.3	5.3	5.3	5.3	5.3
96798	8.4-8.8	native	99A6650-002.002	U	6.4	6.4	6.4	6.4	6.4	6.4
96898	12.3-12.6	native	99A6307-003.002	U	5.3	5.3	5.3	5.3	5.3	5.3
96898	17.1-17.4	bedrock	99A6307-004.002	U	5.3	5.3	5.3	5.3	5.3	5.3
96898	4.4-4.7	native	99A6307-001.002	U	5.2	5.2	5.2	5.2	5.2	5.2

Appendix E  
Real VOC Data

Borehole	Sample Interval	Material	RIN/Event/Bottle	lab_result_qualifier_codes	NAPHTHALENE (ug/kg)	O-DICHLORO BENZENE (ug/kg)	P-DICHLORO BENZENE (ug/kg)	SEC-BUTYL BENZENE (ug/kg)	STYRENE (ug/kg)	TERT-BUTYL BENZENE (ug/kg)
96998	8.4-8.7	native	99A6307-002.002	U	5.2	5.2	5.2	5.2	5.2	5.2
96998	12.4-12.7	native	99A6824-003.002	U	5.6	5.6	5.6	5.6	5.6	5.6
96998	17.2-17.8	bedrock	99A6824-004.002	U	5.7	5.7	5.7	5.7	5.7	5.7
96998	4.4-4.8	native	99A6824-001.002	U	5.3	5.3	5.3	5.3	5.3	5.3
96998	8.4-8.8	native	99A6824-002.002	U	5.2	5.2	5.2	5.2	5.2	5.2
97098	12.4-12.6	native	99A6308-003.003	U	5.1	5.1	5.1	5.1	5.1	5.1
97098	16.5-17.0	bedrock	99A6308-004.003	U	5.7	5.7	5.7	5.7	5.7	5.7
97098	4.2-4.7	native	99A6308-001.003	U	5.5	5.5	5.5	5.5	5.5	5.5
97098	8.4-8.8	native	99A6308-002.003	U	5.8	5.8	5.8	5.8	5.8	5.8
97198	12.4-12.8	native	99A4102-002.009	U				650	650	650
97198	15.5-16.1	native	99A4102-002.012	U				740	740	740
97198	20.4-20.8	native	99A4102-002.015	U	670			670	670	670
97198	24.4-24.8	bedrock	99A4102-002.018	U	700			700	700	700
97198	4.4-4.8	native	99A4102-002.006	U				700	700	700
97198	7.3-7.6	native	99A4102-002.003	U				650	650	650
97298	12.4-12.8	native	99A6825-003.002	U	5.3	5.3	5.3	5.3	5.3	5.3
97298	16.4-17.0	native	99A6825-004.002	U	5.4	5.4	5.4	5.4	5.4	5.4
97298	17.7-18.2	bedrock	99A6825-005.002	U	6.1	6.1	6.1	6.1	6.1	6.1
97298	4.0-4.4	native	99A6825-001.002	U	5.4	5.4	5.4	5.4	5.4	5.4
97298	8.4-8.8	native	99A6825-002.002	U	5.7	5.7	5.7	5.7	5.7	5.7
97698	11.2-11.6	native	99A8275-003.002	U	5.2	5.2	5.2	5.2	5.2	5.2
97698	13.5-13.9	native	99A8275-004.002	U	5.4	5.4	5.4	5.4	5.4	5.4
97698	16.3-16.7	native	99A8275-005.002	U	5.3	5.3	5.3	5.3	5.3	5.3
97698	18.2-18.8	native	99A8275-008.002	U	5.6	5.6	5.6	5.6	5.6	5.6
97698	19.4-19.8	native	99A8275-009.002	U	5.7	5.7	5.7	5.7	5.7	5.7
97698	4.6-5.8	native	99A8275-001.002	U	5.3	5.3	5.3	5.3	5.3	5.3
97698	8.2-8.6	native	99A8275-002.002	U	5.3	5.3	5.3	5.3	5.3	5.3

Appendix E  
Real VOC Data

Borehole	Sample Interval	Material	RIN/Event/Bottle	lab_result_qualifier_codes	TETRACHLOROETHENE (ug/kg)	TOLUENE (ug/kg)	TOLUENE-D8 (ug/kg)	Total Xylene (ug/kg)	TRANS-1,2-DICHLOROETHENE (ug/kg)	TRANS-1,3-DICHLOROPROPENE (ug/kg)
90998	3.8-4.0	native	98A2015-001.010		6100		81			
91198	11.6-11.9	native	98A1091-001.035				95			
91198	15.5-15.8	native	98A1091-001.036				90			
91198	19.1-19.5	native	98A1091-001.037				88			
91198	19.5-19.8	bedrock	98A1091-001.038				92			
91198	3.1-3.4	native	98A1091-001.033				91			
91198	7.7-8.0	native	98A1091-001.034				92			
92598	12.0-12.5	native	98A1092-001.035				94			
92598	16.0-16.75	bedrock	98A1092-001.036				91			
92598	3.5-4.0	native	98A1092-001.033				88			
92598	7.5-8.0	native	98A1092-001.034				99			
95998	12.4-12.8	native	99A7799-003.002				53.5			
95998	14.8-15.2	native	99A7799-004.002				48.7			
95998	17.7-18.2	native	99A7799-005.002				50			
95998	24.6-25.0	bedrock	99A7799-006.002				55.8			
95998	5.0-5.6	native	99A7799-001.002				50			
95998	8.4-8.8	native	99A7799-002.002				45.7			
96298	16.1-16.5	bedrock	99A3210-004.017				92			
96498	13-13.5	native	99A3210-001.015				98			
96498	16.0-16.5	native	99A3210-001.016				98			
96498	18.0-18.6	native	99A3210-001.017				99			
96498	22.0-22.5	bedrock	99A3210-001.018				98			
96498	4.8-5.2	native	99A3210-001.013				99			
96498	9.5-10.0	native	99A3210-001.014				98			
96598	11.6-12.0	native	99A6817-003.002				48.4			
96598	15.2-15.6	native	99A6817-004.002				53			
96598	18.6-18.9	native	99A6817-005.002				46.6			
96598	22.3-22.7	bedrock	99A6817-006.002				55			
96598	4.2-4.6	native	99A6817-001.002				50.3			
96598	8.4-8.8	native	99A6817-002.002				48.4			
96698	12.4-12.8	native	99A6649-003.002				55.2			
96698	17.7-18.3	native	99A7930-001.002				50.6			
96698	20.2-20.6	native	99A7930-002.002				48.2			
96698	22.4-22.8	bedrock	99A7930-003.002				57.8			
96698	4.2-4.6	native	99A6649-001.002				54.8			
96698	8.2-8.6	native	99A6649-002.002				49.5			
96798	12.5-12.9	native	99A6650-003.002				53.8			
96798	16.0-16.4	native	99A6650-004.002		72.2		64.5			
96798	20.4-20.8	native	99A6650-005.002				69			
96798	8.4-8.8	native	99A6650-002.002				53.3			
96898	12.3-12.6	native	99A6307-003.002				50.4			
96898	17.1-17.4	bedrock	99A6307-004.002				40.1			
96898	4.4-4.7	native	99A6307-001.002				40.1			

Appendix E  
Real VOC Data

Borehole	Sample Interval	Material	RIN/Event/Bottle	lab_result_qualifier_codes	TETRACHLOROETHENE (ug/kg)	TOLUENE (ug/kg)	TOLUENE-D8 (ug/kg)	Total Xylene (ug/kg)	TRANS-1,2-DICHLOROETHENE (ug/kg)	TRANS-1,3-DICHLOROPROPENE (ug/kg)
96898	8.4-8.7	native	99A6307-001.002				40.7			
96998	4.4-4.8	native	99A6824-001.002				50.8			
96998	8.4-8.8	native	99A6824-002.002				47.9			
97198	20.4-20.8	native	99A4102-002.015				85.79			
97198	24.4-24.8	bedrock	99A4102-002.018				99.54			
97298	12.4-12.8	native	99A6825-003.002				47.4			
97298	16.4-17.0	native	99A6825-004.002				49.8			
97298	17.7-18.2	bedrock	99A6825-005.002		7.4		52.6			
97298	4.0-4.4	native	99A6825-001.002				48.3			
97298	8.4-8.8	native	99A6825-002.002		9.1		51			
97698	11.2-11.6	native	99A8275-003.002				46.3			
97698	13.5-13.9	native	99A8275-004.002		40.5		49.9			
97698	16.3-16.7	native	99A8275-005.002				45.6			
97698	18.2-18.8	native	99A8275-008.002				48.7			
97698	19.4-19.8	native	99A8275-009.002		76.3		46			
97698	4.6-5.8	native	99A8275-001.002				46.4			
97698	8.2-8.6	native	99A8275-002.002				46			
90998	3.8-4.0	native	98A2015-001.010	B						
91198	11.6-11.9	native	98A1091-001.035	B						
91198	15.5-15.8	native	98A1091-001.036	B						
91198	19.1-19.5	native	98A1091-001.037	B						
91198	19.5-19.8	bedrock	98A1091-001.038	B						
91198	7.7-8.0	native	98A1091-001.034	B						
92598	12.0-12.5	native	98A1092-001.035	B						
92598	16.0-16.75	bedrock	98A1092-001.036	B						
92598	3.5-4.0	native	98A1092-001.033	B						
92598	7.5-8.0	native	98A1092-001.034	B						
97698	11.2-11.6	native	99A8275-003.002	B						
97698	13.5-13.9	native	99A8275-004.002	B						
97698	16.3-16.7	native	99A8275-005.002	B						
97698	18.2-18.8	native	99A8275-008.002	B						
95998	24.6-25.0	bedrock	99A7799-006.002	BJ						
96598	15.2-15.6	native	99A6817-004.002	BJ						
97198	24.4-24.8	bedrock	99A4102-002.018	BJ						
97698	11.2-11.6	native	99A8275-003.002	BJ						
97698	13.5-13.9	native	99A8275-004.002	BJ						
97698	16.3-16.7	native	99A8275-005.002	BJ						
97698	18.2-18.8	native	99A8275-008.002	BJ						
97698	4.6-5.8	native	99A8275-001.002	BJ						
97698	8.2-8.6	native	99A8275-002.002	BJ						
95998	24.6-25.0	bedrock	99A7799-006.002	E	343					
95998	5.0-5.6	native	99A7799-001.002	E	1540					
97698	11.2-11.6	native	99A8275-003.002	E						

Appendix E  
Real VOC Data

Borehole	Sample Interval	Material	RIN/Event/Bottle	lab_result_qualifier_codes	TETRACHLOROETHENE (ug/kg)	TOLUENE (ug/kg)	TOLUENE-D8 (ug/kg)	Total Xylene (ug/kg)	TRANS-1,2-DICHLOROETHENE (ug/kg)	TRANS-1,3-DICHLOROPROPENE (ug/kg)
97698	13.5-13.9	native	99A8275-004.002	E						
97698	16.3-16.7	native	99A8275-005.002	E						
97698	18.2-18.8	native	99A8275-008.002	E						
90998	3.8-4.0	native	98A2015-001.010	J						
95998	12.4-12.8	native	99A7799-003.002	J	1.3					
95998	17.7-18.2	native	99A7799-005.002	J	0.89					
95998	24.6-25.0	bedrock	99A7799-006.002	J						
95998	5.0-5.6	native	99A7799-001.002	J						
96198	4.4-4.7	native	99A3210-003.013	J						
96398	12.4-12.7	native	99A4102-001.009	J						
96398	16.2-16.4	bedrock	99A4102-001.012	J						
96398	4.3-4.8	native	99A4102-001.003	J						
96398	8.4-8.9	native	99A4102-001.006	J						
96498	4.8-5.2	native	99A3210-001.013	J	800					
96598	11.6-12.0	native	99A6817-003.002	J						
96598	22.3-22.7	bedrock	99A6817-006.002	J						
96598	8.4-8.8	native	99A6817-002.002	J		0.96				
96698	12.4-12.8	native	99A6649-003.002	J	2.1					
96698	17.7-18.3	native	99A7930-001.002	J						
96698	20.2-20.6	native	99A7930-002.002	J						
96698	22.4-22.8	bedrock	99A7930-003.002	J	1.6					
96798	12.5-12.9	native	99A6650-003.002	J	0.78					
96798	16.0-16.4	native	99A6650-004.002	J	1.2					
96798	20.4-20.8	native	99A6650-005.002	J						
96798	8.4-8.8	native	99A6650-002.002	J						
96898	17.1-17.4	bedrock	99A6307-004.002	J						
96998	4.4-4.8	native	99A6824-001.002	J						
96998	8.4-8.8	native	99A6824-002.002	J						
97098	4.2-4.7	native	99A6308-001.003	J						
97098	8.4-8.8	native	99A6308-002.003	J						
97198	12.4-12.8	native	99A4102-002.009	J						
97198	15.5-16.1	native	99A4102-002.012	J						
97198	4.4-4.8	native	99A4102-002.006	J						
97198	7.3-7.6	native	99A4102-002.003	J						
97298	12.4-12.8	native	99A6825-003.002	J						
97298	4.0-4.4	native	99A6825-001.002	J						
97298	8.4-8.8	native	99A6825-002.002	J						
97698	11.2-11.6	native	99A8275-003.002	J	2.1					
97698	13.5-13.9	native	99A8275-004.002	J						
97698	16.3-16.7	native	99A8275-005.002	J	1.5					
97698	18.2-18.8	native	99A8275-008.002	J	5.1					
97698	19.4-19.8	native	99A8275-009.002	J						
97698	8.2-8.6	native	99A8275-002.002	J	1.1					



Appendix E  
Real VOC Data

Borehole	Sample Interval	Material	RIN/Event/Bottle	lab_result_qualifier_codes	TETRACHLOROETHENE (ug/kg)	TOLUENE (ug/kg)	TOLUENE-D8 (ug/kg)	Total Xylene (ug/kg)	TRANS-1,2-DICHLOROETHENE (ug/kg)	TRANS-1,3-DICHLOROPROPENE (ug/kg)
91198	11.6-11.9	native	98A1091-001.035	JB						
91198	15.5-15.8	native	98A1091-001.036	JB						
91198	3.1-3.4	native	98A1091-001.033	JB						
91198	7.7-8.0	native	98A1091-001.034	JB						
92598	12.0-12.5	native	98A1092-001.035	JB						
92598	16.0-16.75	bedrock	98A1092-001.036	JB						
96598	22.3-22.7	bedrock	99A6817-006.002	JB						
96698	12.4-12.8	native	99A6649-003.002	JB						
96698	4.2-4.6	native	99A6649-001.002	JB						
96698	8.2-8.6	native	99A6649-002.002	JB						
96798	12.5-12.9	native	99A6650-003.002	JB						
96798	16.0-16.4	native	99A6650-004.002	JB						
96798	20.4-20.8	native	99A6650-005.002	JB						
96798	4.4-4.8	native	99A6650-001.002	JB						
96798	8.4-8.8	native	99A6650-002.002	JB						
96898	12.3-12.6	native	99A6307-003.002	JB						
96898	17.1-17.4	bedrock	99A6307-004.002	JB						
96898	4.4-4.7	native	99A6307-001.002	JB						
96898	8.4-8.7	native	99A6307-002.002	JB						
96998	12.4-12.7	native	99A6824-003.002	JB						
96998	17.2-17.8	bedrock	99A6824-004.002	JB						
96998	4.4-4.8	native	99A6824-001.002	JB						
96998	8.4-8.8	native	99A6824-002.002	JB						
97098	16.5-17.0	bedrock	99A6308-004.003	JB						
97298	16.4-17.0	native	99A6825-004.002	JB						
97298	17.7-18.2	bedrock	99A6825-005.002	JB						
97698	19.4-19.8	native	99A8275-009.002	JB						
90998	3.8-4.0	native	98A2015-001.010	U		790			790	790
91198	11.6-11.9	native	98A1091-001.035	U		690			690	690
91198	15.5-15.8	native	98A1091-001.036	U		680			680	680
91198	19.1-19.5	native	98A1091-001.037	U		630			630	630
91198	19.5-19.8	bedrock	98A1091-001.038	U		620			620	620
91198	3.1-3.4	native	98A1091-001.033	U		710			710	710
91198	7.7-8.0	native	98A1091-001.034	U		680			680	680
92598	12.0-12.5	native	98A1092-001.035	U		700			700	700
92598	16.0-16.75	bedrock	98A1092-001.036	U		720			720	720
92598	3.5-4.0	native	98A1092-001.033	U		650		650	650	650
92598	7.5-8.0	native	98A1092-001.034	U		610		610	610	610
95998	12.4-12.8	native	99A7799-003.002	U		5.8				
95998	14.8-15.2	native	99A7799-004.002	U		5.3				
95998	17.7-18.2	native	99A7799-005.002	U		5.6				
95998	24.6-25.0	bedrock	99A7799-006.002	U		6.3				
95998	5.0-5.6	native	99A7799-001.002	U		5.6				



Appendix E  
Real VOC Data

Borehole	Sample Interval	Material	RIN/Event/Bottle	lab_result_qualifier_codes	TETRACHLOROETHENE (ug/kg)	TOLUENE (ug/kg)	TOLUENE-D8 (ug/kg)	Total Xylene (ug/kg)	TRANS-1,2-DICHLOROETHENE (ug/kg)	TRANS-1,3-DICHLOROPROPENE (ug/kg)
95998	8.4-8.8	native	99A7799-002.002	U	5.2	5.2				
96098	12.5-13.0	native	99A3210-002.015	U	700	700			700	700
96098	16.0-16.2	bedrock	99A3210-002.016	U	700	700			700	700
96098	4.5-4.8	native	99A3210-002.013	U	730	730			730	730
96098	8.5-8.8	native	99A3210-002.014	U	690	690			690	690
96198	12.0-12.5	native	99A3210-003.015	U	760	760			760	760
96198	15.8-16.2	bedrock	99A3210-003.016	U	700	700			700	700
96198	4.4-4.7	native	99A3210-003.013	U	700	700			700	700
96198	8.1-8.5	native	99A3210-003.014	U	670	670			670	670
96298	12.25-12.75	native	99A3210-004.016	U	750	750			750	750
96298	16.1-16.5	bedrock	99A3210-004.017	U	720	720			720	720
96298	4.3-4.7	native	99A3210-004.013	U	700	700			700	700
96298	8.0-9.0	native	99A3210-004.014	U	670	670			670	670
96398	12.4-12.7	native	99A4102-001.009	U	710	710			710	710
96398	16.2-16.4	bedrock	99A4102-001.012	U	730	730			730	730
96398	4.3-4.8	native	99A4102-001.003	U	700	700			700	700
96398	8.4-8.9	native	99A4102-001.006	U	710	710			710	710
96498	13-13.5	native	99A3210-001.015	U	1300	1300				1300
96498	16.0-16.5	native	99A3210-001.016	U	1300	1300				1300
96498	18.0-18.6	native	99A3210-001.017	U	1300	1300				1300
96498	22.0-22.5	bedrock	99A3210-001.018	U	1500	1500				1500
96498	4.8-5.2	native	99A3210-001.013	U		1500				1500
96498	9.5-10.0	native	99A3210-001.014	U	1300	1300				1300
96598	11.6-12.0	native	99A6817-003.002	U	5.4	5.4				
96598	15.2-15.6	native	99A6817-004.002	U	6	6				
96598	18.6-18.9	native	99A6817-005.002	U	5.3	5.3				
96598	22.3-22.7	bedrock	99A6817-006.002	U	6.2	6.2				
96598	4.2-4.6	native	99A6817-001.002	U	5.7	5.7				
96598	8.4-8.8	native	99A6817-002.002	U	5.3	5.3				
96698	12.4-12.8	native	99A6649-003.002	U						
96698	17.7-18.3	native	99A7930-001.002	U	5.6	5.6				
96698	20.2-20.6	native	99A7930-002.002	U	5.4	5.4				
96698	22.4-22.8	bedrock	99A7930-003.002	U	6.4	6.4				
96698	4.2-4.6	native	99A6649-001.002	U	5.7	5.7				
96698	8.2-8.6	native	99A6649-002.002	U	5.6	5.6				
96798	12.5-12.9	native	99A6650-003.002	U	6.2	6.2				
96798	16.0-16.4	native	99A6650-004.002	U	7.2	7.2				
96798	20.4-20.8	native	99A6650-005.002	U	7.4	7.4				
96798	4.4-4.8	native	99A6650-001.002	U	5.3	5.3				
96798	8.4-8.8	native	99A6650-002.002	U	6.3	6.3				
96898	12.3-12.6	native	99A6307-003.002	U	6.4	6.4				
96898	17.1-17.4	bedrock	99A6307-004.002	U	5.3	5.3				
96898	4.4-4.7	native	99A6307-001.002	U	5.2	5.2				

Appendix E  
Real VOC Data

Borehole	Sample Interval	Material	RIN/Event/Bottle	lab_result_qualifier_codes	TETRACHLOROETHENE (ug/kg)	TOLUENE (ug/kg)	TOLUENE-D8 (ug/kg)	Total Xylene (ug/kg)	TRANS-1,2-DICHLOROETHENE (ug/kg)	TRANS-1,3-DICHLOROPROPENE (ug/kg)
96898	8.4-8.7	native	99A6307-002.002	U	5.2	5.2				
96998	12.4-12.7	native	99A6824-003.002	U	5.6	5.6				
96998	17.2-17.8	bedrock	99A6824-004.002	U	5.7	5.7				
96998	4.4-4.8	native	99A6824-001.002	U	5.3	5.3				
96998	8.4-8.8	native	99A6824-002.002	U	5.2	5.2				
97098	12.4-12.6	native	99A6308-003.003	U	5.1	5.1				
97098	16.5-17.0	bedrock	99A6308-004.003	U	5.7	5.7				
97098	4.2-4.7	native	99A6308-001.003	U	5.5	5.5				
97098	8.4-8.8	native	99A6308-002.003	U	5.8	5.8				
97198	12.4-12.8	native	99A4102-002.009	U	650	650			650	650
97198	15.5-16.1	native	99A4102-002.012	U	740	740			740	740
97198	20.4-20.8	native	99A4102-002.015	U	670	670			670	670
97198	24.4-24.8	bedrock	99A4102-002.018	U	700	700			700	700
97198	4.4-4.8	native	99A4102-002.006	U	700	700			700	700
97198	7.3-7.6	native	99A4102-002.003	U	650	650			650	650
97298	12.4-12.8	native	99A6825-003.002	U	5.3	5.3				
97298	16.4-17.0	native	99A6825-004.002	U	5.4	5.4				
97298	17.7-18.2	bedrock	99A6825-005.002	U		6.1				
97298	4.0-4.4	native	99A6825-001.002	U	5.4	5.4				
97298	8.4-8.8	native	99A6825-002.002	U		5.7				
97698	11.2-11.6	native	99A8275-003.002	U		5.2				
97698	13.5-13.9	native	99A8275-004.002	U		5.4				
97698	16.3-16.7	native	99A8275-005.002	U		5.3				
97698	18.2-18.8	native	99A8275-008.002	U		5.6				
97698	19.4-19.8	native	99A8275-009.002	U		5.7				
97698	4.6-5.8	native	99A8275-001.002	U	5.3	5.3				
97698	8.2-8.6	native	99A8275-002.002	U		5.3				

Appendix E  
Real VOC Data

Borehole	Sample Interval	Material	RIN/Event/Bottle	lab_result_qualifier_codes	TRANS-1,3-DICHLOROPROPYLENE (ug/kg)	TRICHLOROETHENE (ug/kg)	TRICHLOROFLUORO METHANE (ug/kg)	TRICHLOROTRIFLUOROETHANE (ug/kg)	VINYL CHLORIDE (ug/kg)	XYLENE (TOTAL) (ug/kg)	XYLENES (TOTAL) (ug/kg)
90998	3.8-4.0	native	98A2015-001.010								
91198	11.6-11.9	native	98A1091-001.035								
91198	15.5-15.8	native	98A1091-001.036								
91198	19.1-19.5	native	98A1091-001.037								
91198	19.5-19.8	bedrock	98A1091-001.038								
91198	3.1-3.4	native	98A1091-001.033								
91198	7.7-8.0	native	98A1091-001.034								
92598	12.0-12.5	native	98A1092-001.035								
92598	16.0-16.75	bedrock	98A1092-001.036								
92598	3.5-4.0	native	98A1092-001.033								
92598	7.5-8.0	native	98A1092-001.034								
95998	12.4-12.8	native	99A7799-003.002								
95998	14.8-15.2	native	99A7799-004.002								
95998	17.7-18.2	native	99A7799-005.002								
95998	24.6-25.0	bedrock	99A7799-006.002			12.9					
95998	5.0-5.6	native	99A7799-001.002			9.9					
95998	8.4-8.8	native	99A7799-002.002								
96298	16.1-16.5	bedrock	99A3210-004.017								
96498	13-13.5	native	99A3210-001.015								
96498	16.0-16.5	native	99A3210-001.016								
96498	18.0-18.6	native	99A3210-001.017								
96498	22.0-22.5	bedrock	99A3210-001.018								
96498	4.8-5.2	native	99A3210-001.013								
96498	9.5-10.0	native	99A3210-001.014								
96598	11.6-12.0	native	99A6817-003.002								
96598	15.2-15.6	native	99A6817-004.002								
96598	18.6-18.9	native	99A6817-005.002								
96598	22.3-22.7	bedrock	99A6817-006.002								
96598	4.2-4.6	native	99A6817-001.002								
96598	8.4-8.8	native	99A6817-002.002								
96698	12.4-12.8	native	99A6649-003.002								
96698	17.7-18.3	native	99A7930-001.002								
96698	20.2-20.6	native	99A7930-002.002								
96698	22.4-22.8	bedrock	99A7930-003.002								
96698	4.2-4.6	native	99A6649-001.002								
96698	8.2-8.6	native	99A6649-002.002								
96798	12.5-12.9	native	99A6650-003.002								
96798	16.0-16.4	native	99A6650-004.002								
96798	20.4-20.8	native	99A6650-005.002			16.1					
96798	8.4-8.8	native	99A6650-002.002								
96898	12.3-12.6	native	99A6307-003.002								
96898	17.1-17.4	bedrock	99A6307-004.002								
96898	4.4-4.7	native	99A6307-001.002								

Appendix E  
Real VOC Data

Borehole	Sample Interval	Material	RIN/Event/Bottle	lab_result_qualifier_codes	TRANS-1,3-DICHLOROPROPYLENE (ug/kg)	TRICHLOROETHENE (ug/kg)	TRICHLOROFLUORO METHANE (ug/kg)	TRICHLOROTRIFLUOROETHANE (ug/kg)	VINYL CHLORIDE (ug/kg)	XYLENE (TOTAL) (ug/kg)	XYLENES (TOTAL) (ug/kg)
96898	8.4-8.7	native	99A6307-002.002								
96998	4.4-4.8	native	99A6824-001.002								
96998	8.4-8.8	native	99A6824-002.002								
97198	20.4-20.8	native	99A4102-002.015								
97198	24.4-24.8	bedrock	99A4102-002.018								
97298	12.4-12.8	native	99A6825-003.002								
97298	16.4-17.0	native	99A6825-004.002								
97298	17.7-18.2	bedrock	99A6825-005.002								
97298	4.0-4.4	native	99A6825-001.002								
97298	8.4-8.8	native	99A6825-002.002								
97698	11.2-11.6	native	99A8275-003.002								
97698	13.5-13.9	native	99A8275-004.002								
97698	16.3-16.7	native	99A8275-005.002								
97698	18.2-18.8	native	99A8275-008.002								
97698	19.4-19.8	native	99A8275-009.002			5.8					
97698	4.6-5.8	native	99A8275-001.002								
97698	8.2-8.6	native	99A8275-002.002								
90998	3.8-4.0	native	98A2015-001.010	B							
91198	11.6-11.9	native	98A1091-001.035	B							
91198	15.5-15.8	native	98A1091-001.036	B							
91198	19.1-19.5	native	98A1091-001.037	B							
91198	19.5-19.8	bedrock	98A1091-001.038	B							
91198	7.7-8.0	native	98A1091-001.034	B							
92598	12.0-12.5	native	98A1092-001.035	B							
92598	16.0-16.75	bedrock	98A1092-001.036	B							
92598	3.5-4.0	native	98A1092-001.033	B							
92598	7.5-8.0	native	98A1092-001.034	B							
97698	11.2-11.6	native	99A8275-003.002	B							
97698	13.5-13.9	native	99A8275-004.002	B							
97698	16.3-16.7	native	99A8275-005.002	B							
97698	18.2-18.8	native	99A8275-008.002	B							
95998	24.6-25.0	bedrock	99A7799-006.002	BJ							
96598	15.2-15.6	native	99A6817-004.002	BJ							
97198	24.4-24.8	bedrock	99A4102-002.018	BJ							
97698	11.2-11.6	native	99A8275-003.002	BJ							
97698	13.5-13.9	native	99A8275-004.002	BJ							
97698	16.3-16.7	native	99A8275-005.002	BJ							
97698	18.2-18.8	native	99A8275-008.002	BJ							
97698	4.6-5.8	native	99A8275-001.002	BJ							
97698	8.2-8.6	native	99A8275-002.002	BJ							
95998	24.6-25.0	bedrock	99A7799-006.002	E							
95998	5.0-5.6	native	99A7799-001.002	E							
97698	11.2-11.6	native	99A8275-003.002	E				1890			

Appendix E  
Real VOC Data

Borehole	Sample Interval	Material	RIN/Event/Bottle	lab_result_qualifier_codes	TRANS-1,3-DICHLOROPROPYLENE (ug/kg)	TRICHLOROETHENE (ug/kg)	TRICHLOROFLUORO METHANE (ug/kg)	TRICHLOROTRIFLUOROETHANE (ug/kg)	VINYL CHLORIDE (ug/kg)	XYLENE (TOTAL) (ug/kg)	XYLENES (TOTAL) (ug/kg)
97698	13.5-13.9	native	99A8275-004.002	E				2110			
97698	16.3-16.7	native	99A8275-005.002	E				2100			
97698	18.2-18.8	native	99A8275-008.002	E				2040			
90998	3.8-4.0	native	98A2015-001.010	J		290					
95998	12.4-12.8	native	99A7799-003.002	J							
95998	17.7-18.2	native	99A7799-005.002	J							
95998	24.6-25.0	bedrock	99A7799-006.002	J							
95998	5.0-5.6	native	99A7799-001.002	J							
96198	4.4-4.7	native	99A3210-003.013	J							
96398	12.4-12.7	native	99A4102-001.009	J							
96398	16.2-16.4	bedrock	99A4102-001.012	J							
96398	4.3-4.8	native	99A4102-001.003	J							
96398	8.4-8.9	native	99A4102-001.006	J							
96498	4.8-5.2	native	99A3210-001.013	J							
96598	11.6-12.0	native	99A6817-003.002	J							
96598	22.3-22.7	bedrock	99A6817-006.002	J							
96598	8.4-8.8	native	99A6817-002.002	J							
96698	12.4-12.8	native	99A6649-003.002	J							
96698	17.7-18.3	native	99A7930-001.002	J							
96698	20.2-20.6	native	99A7930-002.002	J							
96698	22.4-22.8	bedrock	99A7930-003.002	J	0.89						
96798	12.5-12.9	native	99A6650-003.002	J				1.1			
96798	16.0-16.4	native	99A6650-004.002	J				1.1			
96798	20.4-20.8	native	99A6650-005.002	J							
96798	8.4-8.8	native	99A6650-002.002	J							
96898	17.1-17.4	bedrock	99A6307-004.002	J							
96998	4.4-4.8	native	99A6824-001.002	J							
96998	8.4-8.8	native	99A6824-002.002	J							
97098	4.2-4.7	native	99A6308-001.003	J							
97098	8.4-8.8	native	99A6308-002.003	J							
97198	12.4-12.8	native	99A4102-002.009	J							
97198	15.5-16.1	native	99A4102-002.012	J							
97198	4.4-4.8	native	99A4102-002.006	J							
97198	7.3-7.6	native	99A4102-002.003	J							
97298	12.4-12.8	native	99A6825-003.002	J							
97298	4.0-4.4	native	99A6825-001.002	J				0.8			
97298	8.4-8.8	native	99A6825-002.002	J							
97698	11.2-11.6	native	99A8275-003.002	J							
97698	13.5-13.9	native	99A8275-004.002	J	3						
97698	16.3-16.7	native	99A8275-005.002	J							
97698	18.2-18.8	native	99A8275-008.002	J							
97698	19.4-19.8	native	99A8275-009.002	J							
97698	8.2-8.6	native	99A8275-002.002	J							

Appendix E  
Real VOC Data

Borehole	Sample Interval	Material	RIN/Event/Bottle	lab_result_qualifier_codes	TRANS-1,3-DICHLOROPROPYLENE (ug/kg)	TRICHLOROETHENE (ug/kg)	TRICHLOROFLUORO METHANE (ug/kg)	TRICHLOROTRIFLUOROETHANE (ug/kg)	VINYL CHLORIDE (ug/kg)	XYLENE (TOTAL) (ug/kg)	XYLENES (TOTAL) (ug/kg)
91198	11.6-11.9	native	98A1091-001.035	JB							
91198	15.5-15.8	native	98A1091-001.036	JB							
91198	3.1-3.4	native	98A1091-001.033	JB							
91198	7.7-8.0	native	98A1091-001.034	JB							
92598	12.0-12.5	native	98A1092-001.035	JB							
92598	16.0-16.75	bedrock	98A1092-001.036	JB							
96598	22.3-22.7	bedrock	99A6817-006.002	JB							
96698	12.4-12.8	native	99A6649-003.002	JB							
96698	4.2-4.6	native	99A6649-001.002	JB							
96698	8.2-8.6	native	99A6649-002.002	JB							
96798	12.5-12.9	native	99A6650-003.002	JB							
96798	16.0-16.4	native	99A6650-004.002	JB							
96798	20.4-20.8	native	99A6650-005.002	JB							
96798	4.4-4.8	native	99A6650-001.002	JB							
96798	8.4-8.8	native	99A6650-002.002	JB							
96898	12.3-12.6	native	99A6307-003.002	JB							
96898	17.1-17.4	bedrock	99A6307-004.002	JB							
96898	4.4-4.7	native	99A6307-001.002	JB							
96898	8.4-8.7	native	99A6307-002.002	JB							
96998	12.4-12.7	native	99A6824-003.002	JB							
96998	17.2-17.8	bedrock	99A6824-004.002	JB							
96998	4.4-4.8	native	99A6824-001.002	JB							
96998	8.4-8.8	native	99A6824-002.002	JB							
97098	16.5-17.0	bedrock	99A6308-004.003	JB							
97298	16.4-17.0	native	99A6825-004.002	JB							
97298	17.7-18.2	bedrock	99A6825-005.002	JB							
97698	19.4-19.8	native	99A8275-009.002	JB							
90998	3.8-4.0	native	98A2015-001.010	U			790		1600		790
91198	11.6-11.9	native	98A1091-001.035	U		690			1400		690
91198	15.5-15.8	native	98A1091-001.036	U		680			1400		680
91198	19.1-19.5	native	98A1091-001.037	U		630			1300		630
91198	19.5-19.8	bedrock	98A1091-001.038	U		620			1200		620
91198	3.1-3.4	native	98A1091-001.033	U		710			1400		710
91198	7.7-8.0	native	98A1091-001.034	U		680			1400		680
92598	12.0-12.5	native	98A1092-001.035	U		700			1400		700
92598	16.0-16.75	bedrock	98A1092-001.036	U		720			1400		720
92598	3.5-4.0	native	98A1092-001.033	U		650			1300		
92598	7.5-8.0	native	98A1092-001.034	U		610			1200		
95998	12.4-12.8	native	99A7799-003.002	U	5.8	5.8	5.8	5.8	5.8	5.8	5.8
95998	14.8-15.2	native	99A7799-004.002	U	5.3	5.3	5.3	5.3	5.3	5.3	5.3
95998	17.7-18.2	native	99A7799-005.002	U	5.6	5.6	5.6	5.6	5.6	5.6	5.6
95998	24.6-25.0	bedrock	99A7799-006.002	U	6.3	6.3	6.3	6.3	6.3	6.3	6.3
95998	5.0-5.6	native	99A7799-001.002	U	5.6		5.6	5.6	5.6	5.6	5.6

Appendix E  
Real VOC Data

Borehole	Sample Interval	Material	RIN/Event/Bottle	lab_result_qualifier_codes	TRANS-1,3-DICHLOROPROPYLENE (ug/kg)	TRICHLOROETHENE (ug/kg)	TRICHLOROFLUORO METHANE (ug/kg)	TRICHLOROTRIFLUOROETHANE (ug/kg)	VINYL CHLORIDE (ug/kg)	XYLENE (TOTAL) (ug/kg)	XYLENES (TOTAL) (ug/kg)
95998 8.4-8.8	native		99A799-002.002	U	5.2	5.2	5.2	5.2	5.2	5.2	5.2
96098 12.5-13.0	native		99A3210-002.015	U		700	700		700	700	
96098 16.0-16.2	bedrock		99A3210-002.016	U		700	700		700	700	
96098 4.5-4.8	native		99A3210-002.013	U		730	730		730	730	
96098 8.5-8.8	native		99A3210-002.014	U		690	690		690	690	
96198 12.0-12.5	native		99A3210-003.015	U		760	760		760	760	
96198 15.8-16.2	bedrock		99A3210-003.016	U		700	700		700	700	
96198 4.4-4.7	native		99A3210-003.013	U		700	700		700	700	
96198 8.1-8.5	native		99A3210-003.014	U		670	670		670	670	
96298 12.25-12.75	native		99A3210-004.016	U		750	750		750	750	
96298 16.1-16.5	bedrock		99A3210-004.017	U		720	720		720	720	
96298 4.3-4.7	native		99A3210-004.013	U		700	700		700	700	
96298 8.0-9.0	native		99A3210-004.014	U		670	670		670	670	
96398 12.4-12.7	native		99A4102-001.009	U		710	710		710	710	
96398 16.2-16.4	bedrock		99A4102-001.012	U		730	730		730	730	
96398 4.3-4.8	native		99A4102-001.003	U		700	700		700	700	
96398 8.4-8.9	native		99A4102-001.006	U		710	710		710	710	
96498 13-13.5	native		99A3210-001.015	U		1300			1300	1300	
96498 16.0-16.5	native		99A3210-001.016	U		1300			1300	1300	
96498 18.0-18.6	native		99A3210-001.017	U		1300			1300	1300	
96498 22.0-22.5	bedrock		99A3210-001.018	U		1500			1500	1500	
96498 4.8-5.2	native		99A3210-001.013	U		1500			1500	1500	
96498 9.5-10.0	native		99A3210-001.014	U		1300			1300	1300	
96598 11.6-12.0	native		99A6817-003.002	U	5.4	5.4	5.4	10.8	5.4	5.4	5.4
96598 15.2-15.6	native		99A6817-004.002	U	6	6	6	12	6	6	6
96598 18.6-18.9	native		99A6817-005.002	U	5.3	5.3	5.3	10.6	5.3	5.3	5.3
96598 22.3-22.7	bedrock		99A6817-006.002	U	6.2	6.2	6.2	12.5	6.2	6.2	6.2
96598 4.2-4.6	native		99A6817-001.002	U	5.7	5.7	5.7	11.4	5.7	5.7	5.7
96598 8.4-8.8	native		99A6817-002.002	U	5.3	5.3	5.3	10.5	5.3	5.3	5.3
96698 12.4-12.8	native		99A6649-003.002	U	5.9	5.9	5.9	5.9	5.9	5.9	5.9
96698 17.7-18.3	native		99A7930-001.002	U	5.6	5.6	5.6	11.1	5.6	5.6	5.6
96698 20.2-20.6	native		99A7930-002.002	U	5.4	5.4	5.4	10.8	5.4	5.4	5.4
96698 22.4-22.8	bedrock		99A7930-003.002	U	6.4	6.4	6.4	12.8	6.4	6.4	6.4
96698 4.2-4.6	native		99A6649-001.002	U	5.7	5.7	5.7	5.7	5.7	5.7	5.7
96698 8.2-8.6	native		99A6649-002.002	U	5.6	5.6	5.6	5.6	5.6	5.6	5.6
96798 12.5-12.9	native		99A6650-003.002	U	6.2	6.2	6.2	6.2	6.2	6.2	6.2
96798 16.0-16.4	native		99A6650-004.002	U	7.2	7.2	7.2	7.2	7.2	7.2	7.2
96798 20.4-20.8	native		99A6650-005.002	U	7.4	7.4	7.4	7.4	7.4	7.4	7.4
96798 4.4-4.8	native		99A6650-001.002	U	5.3	5.3	5.3	10.6	5.3	5.3	5.3
96798 8.4-8.8	native		99A6650-002.002	U	6.3	6.3	6.3	6.3	6.3	6.3	6.3
96898 12.3-12.6	native		99A6307-003.002	U	6.4	6.4	6.4	6.4	6.4	6.4	6.4
96898 17.1-17.4	bedrock		99A6307-004.002	U	5.3	5.3	5.3	5.3	5.3	5.3	5.3
96898 4.4-4.7	native		99A6307-001.002	U	5.2	5.2	5.2	5.2	5.2	5.2	5.2



Appendix E  
Real VOC Data

Borehole	Sample Interval	Material	RIN/Event/Bottle	lab_result_qualifier_codes	TRANS-1,3-DICHLOROPROPYLENE (ug/kg)	TRICHLOROETHENE (ug/kg)	TRICHLOROFLUORO METHANE (ug/kg)	TRICHLOROTRIFLUOROETHANE (ug/kg)	VINYL CHLORIDE (ug/kg)	XYLENE (TOTAL) (ug/kg)	XYLENES (TOTAL) (ug/kg)
96898	8.4-8.7	native	99A6307-002.002	U	5.2	5.2	5.2	5.2	5.2	5.2	5.2
96998	12.4-12.7	native	99A6824-003.002	U	5.6	5.6	5.6	11.5	5.6	5.6	5.6
96998	17.2-17.8	bedrock	99A6824-004.002	U	5.7	5.7	5.7	11.5	5.7	5.7	5.7
96998	4.4-4.8	native	99A6824-001.002	U	5.3	5.3	5.3	5.3	5.3	5.3	5.3
96998	8.4-8.8	native	99A6824-002.002	U	5.2	5.2	5.2	5.2	5.2	5.2	5.2
97098	12.4-12.6	native	99A6308-003.003	U	5.1	5.1	5.1	5.1	5.1	5.1	5.1
97098	16.5-17.0	bedrock	99A6308-004.003	U	5.7	5.7	5.7	5.7	5.7	5.7	5.7
97098	4.2-4.7	native	99A6308-001.003	U	5.5	5.5	5.5	11	5.5	5.5	5.5
97098	8.4-8.8	native	99A6308-002.003	U	5.8	5.8	5.8	5.8	5.8	5.8	5.8
97198	12.4-12.8	native	99A4102-002.009	U		650	650		650	650	
97198	15.5-16.1	native	99A4102-002.012	U		740	740		740	740	
97198	20.4-20.8	native	99A4102-002.015	U		670	670		670	670	
97198	24.4-24.8	bedrock	99A4102-002.018	U		700	700		700	700	
97198	4.4-4.8	native	99A4102-002.006	U		700	700		700	700	
97198	7.3-7.6	native	99A4102-002.003	U		650	650		650	650	
97298	12.4-12.8	native	99A6825-003.002	U	5.3	5.3	5.3	10.6	5.3	5.3	5.3
97298	16.4-17.0	native	99A6825-004.002	U	5.4	5.4	5.4	5.4	5.4	5.4	5.4
97298	17.7-18.2	bedrock	99A6825-005.002	U	6.1	6.1	6.1	6.1	6.1	6.1	6.1
97298	4.0-4.4	native	99A6825-001.002	U	5.4	5.4	5.4	5.4	5.4	5.4	5.4
97298	8.4-8.8	native	99A6825-002.002	U	5.7	5.7	5.7	11.4	5.7	5.7	5.7
97698	11.2-11.6	native	99A8275-003.002	U	5.2	5.2	5.2		5.2	5.2	5.2
97698	13.5-13.9	native	99A8275-004.002	U	5.4	5.4	5.4		5.4	5.4	5.4
97698	16.3-16.7	native	99A8275-005.002	U	5.3	5.3	5.3		5.3	5.3	5.3
97698	18.2-18.8	native	99A8275-008.002	U	5.6	5.6	5.6		5.6	5.6	5.6
97698	19.4-19.8	native	99A8275-009.002	U	5.7		5.7	11.5	5.7	5.7	5.7
97698	4.6-5.8	native	99A8275-001.002	U	5.3	5.3	5.3	5.3	5.3	5.3	5.3
97698	8.2-8.6	native	99A8275-002.002	U	5.3	5.3	5.3	5.3	5.3	5.3	5.3

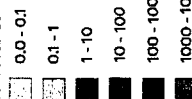




Characterization Report  
for the 903 Drum  
Storage Area, 903 Lip Area  
and Americium Zone  
1994 HPGe Survey Data  
for Am-241  
in Investigation Area

Figure 1-2

HPGe Data Ranges--pCi/g for a Field  
of View of 150 feet (DOE, 1995)



Standard Map Features

- Buildings and other structures
- Lakes and ponds
- Streams, ditches, or other drainage features
- Fences and other barriers
- Rocky Flats boundary
- Paved roads
- Dirt roads

DATA SOURCE:  
Buildings, fences, hydrography, roads and other features were digitized from the 1995  
DOE Rocky Flats Environmental Technology Site  
Map Series (DOE, 1995).

DOE  
Rocky Flats Environmental Technology Site  
Map Series (DOE, 1995)

The map was prepared by Rocky Mountain  
Remediation Services, LLC, using data from the  
DOE Rocky Flats Environmental Technology Site  
Map Series (DOE, 1995). The map was prepared  
using the following information:  
1. The 1995 HPGe Survey Data for Am-241  
in the Investigation Area.  
2. The 1995 DOE Rocky Flats Environmental  
Technology Site Map Series (DOE, 1995).

Rocky Mountain  
Remediation Services, LLC  
Geographic Information Systems Group  
10000 North Central  
Avenue, Suite 100  
Golden, CO 80602-4064

Scale = 1:20,000  
1 inch represents approximately 323 feet

State Plane Coordinate Projection  
Central Time Zone  
Datum: NAD83

U.S. Department of Energy  
Rocky Flats Environmental Technology Site



Rocky Mountain  
Remediation Services, LLC  
Geographic Information Systems Group  
10000 North Central  
Avenue, Suite 100  
Golden, CO 80602-4064

MAP ID: 95-0403

September 15, 1999



Characterization Report  
for the 903 Drum  
Storage Area, 903 Lip Area  
and Americium Zone

OU2 Phase II RFIRI  
Surface Soil Sampling Plots  
Study Area

Figure 1-3

- EXPLANATION**
- CDH & RF Surface Soil Sampling Plots - (DOE, 1995a)
  - Study Area
  - 903 Lip Area
  - Sampling Plots Exceeding Tier I Soil Action Levels - Radionuclides (DOE, 1995a)
- Standard Map Features**
- Buildings and other structures
  - Solar Evaporation Ponds (SEP)
  - Lakes and ponds
  - Streams, ditches, or other drainage features
  - Fences and other barriers
  - Contour (20-Foot)
  - Paved roads
  - Dirt roads

**DATA SOURCE:**  
The data for this map were derived from a variety of sources. The data for the CDH & RF Surface Soil Sampling Plots were derived from the DOE, 1995a report. The data for the Study Area were derived from the DOE, 1995a report. The data for the 903 Lip Area were derived from the DOE, 1995a report. The data for the Sampling Plots Exceeding Tier I Soil Action Levels - Radionuclides were derived from the DOE, 1995a report. The data for the Standard Map Features were derived from the DOE, 1995a report.

**NOTES:**  
This map was prepared by Rocky Mountain Remediation Services, LLC. The map was prepared using the data provided by the DOE, 1995a report. The map was prepared using the data provided by the DOE, 1995a report. The map was prepared using the data provided by the DOE, 1995a report.

Scale = 1 : 2630  
1 inch represents approximately 1903 feet

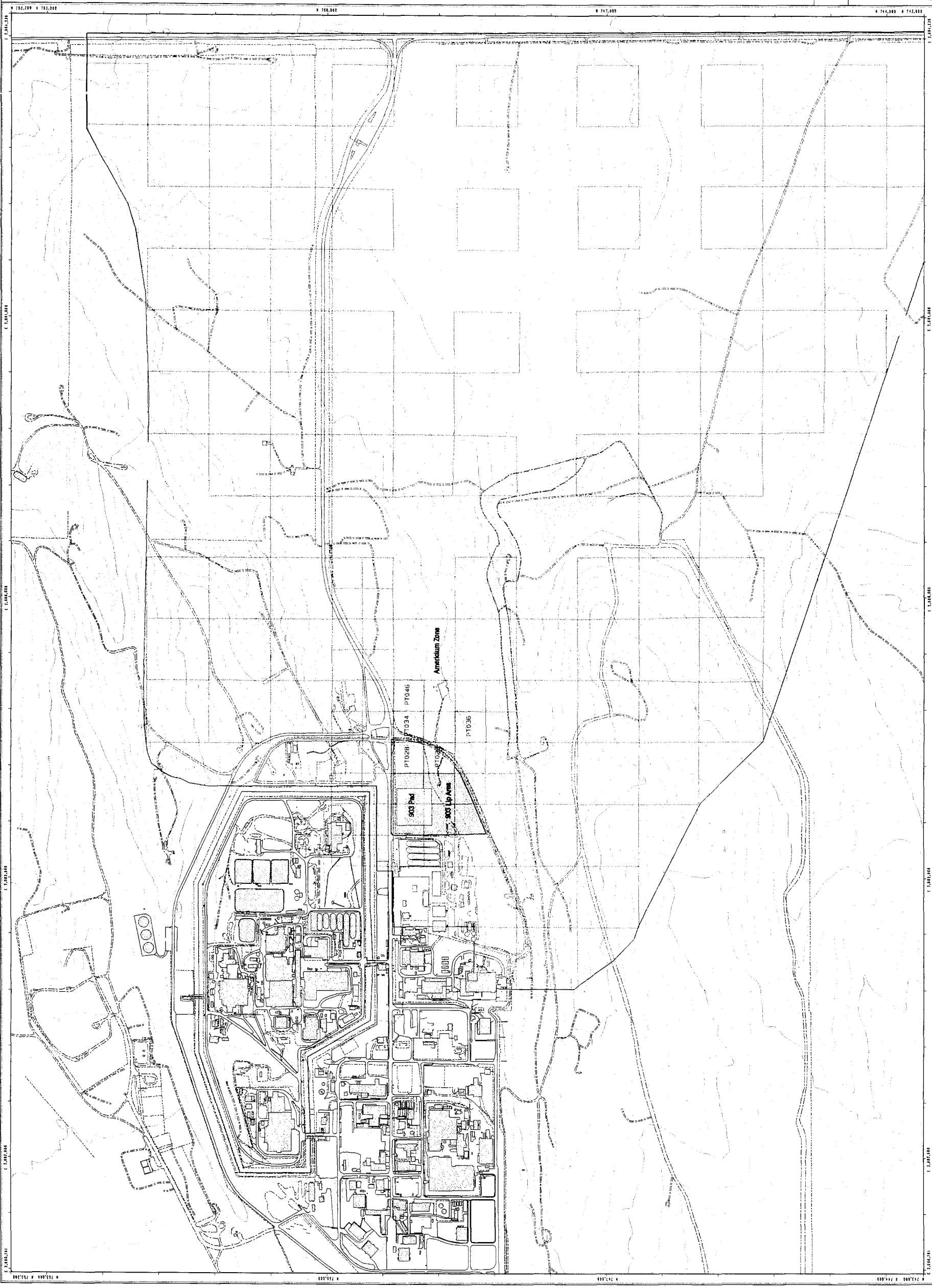
State Plane Coordinates, Projection  
Colorado Central Zone  
Datum: NAD27

U.S. Department of Energy  
Rocky Flats Environmental Technology Site

Prepared by:  
**RMRS**  
Rocky Mountain  
Remediation Services, LLC.  
Geographic Information Systems Group  
P.O. Box 100  
Golden, CO 80402-0100

MAP ID: 06-0003

September 18, 1999


















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# Characterization Report for the 903 Drum Storage Area, 903 Lip Area and Americium Zone

Investigation Area  
Location Map

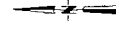
### Figure 1-4

### EXPLANATION

- |   |   |
|---|---|
|  | HPGs 150 foot FOW Circles<br>(above Top/Clg Am-241) |
|  | Plots above Tier 1 Action Levels                    |
|  | Groundwater Well Locations                          |
|  | Soil profile Sampling Sites                         |
|  | 1976 Soil Removal Area (approx)                     |
|  | 1978 Soil Removal Area (approx)                     |
|  | 1970 Soil Fill Area (approx)                        |
|  | 1984 Soil Fill Area (approx)                        |
|  | <b>Standard Map Features</b>                        |
|  | Buildings and other structures                      |
|  | Lakes and ponds                                     |
|  | Streams, ditches, or other<br>drainage features     |
|  | Fences and other barriers                           |
|  | Paved roads   |
|  | Dirt roads  |

**DATA SOURCE:**  
Buildings, fences, hydrography, roads and other  
attributes from 1934 aerial 1:50,000 scale data  
captured by ES&G RSL, Las Vegas.  
Digitized from the orthophotographs 1915  
HRC data from Ron Pearson, Bureau Survey Group,  
Seaford Measurements, ES&G Rocky Flats, Inc.  
June 1994

13524456614  
Journal of the United Nations Educational, Scientific and Cultural Organization  
Volume 10, Number 1, 1966  
Published by the United Nations Educational, Scientific and Cultural Organization  
Paris, France  
Distributed by the United Nations Educational, Scientific and Cultural Organization  
New York, New York, U.S.A.



Scale = 1 : 2270  
1 inch represents approximately 189 feet



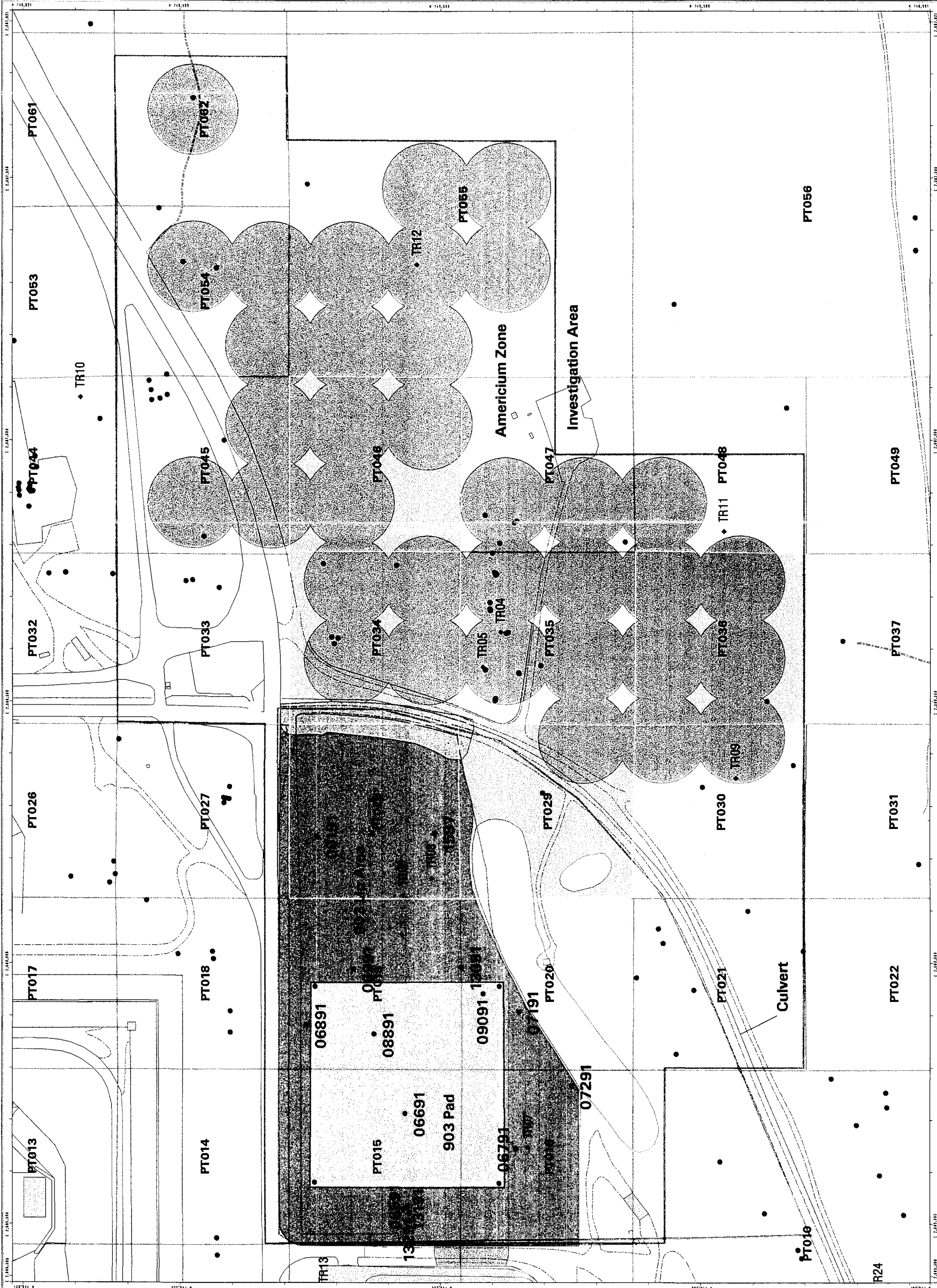
State Plane Coordinate Projection  
Colorado Central Zone  
Datum: NAD27

U.S. Department of Energy  
Rocky Flats Environmental Technology Site



**Rocky Mountain  
Remediation Services, LLC**  
Geographic Information Systems Group  
Rocky Flats Environmental Technology Site  
P.O. Box 484  
Golden, CO 80602-0484

MAP ID: 99-0403  
September 16, 1999







**Characterization Report  
for the  
903 Drum Storage Area, 903 Lip Area  
and Americium Zone**

**RSAL Exceedances in Surface  
Soil using HPGe Results**

**Figure 2-6**

**EXPLANATION**

- Gamma Survey Locations
- Investigative Area

**HPGe Data Ranges**

- Below Tier II Action Levels
- Exceeds Tier II Action Levels
- Exceeds Tier I Action Levels

**Surface Soil Data Ranges**

- Below Tier II Action Levels
- Exceeds Tier II Action Levels

TR = Trench

HPGe = HPGe Measurement

AME = Americium Migration Evaluation

**Standard Map Features**

- Steep Topography
- Wetland Area
- Cement
- Buildings and other structures
- Lakes and ponds
- Streams, ditches, or other drainage features
- Fences and other barriers
- Contour (20-Foot)
- Paved roads
- Dirt roads

Scale = 1:2160  
1 inch represents 160 feet

State Plane Coordinates  
NAD83  
Datum: NAD83

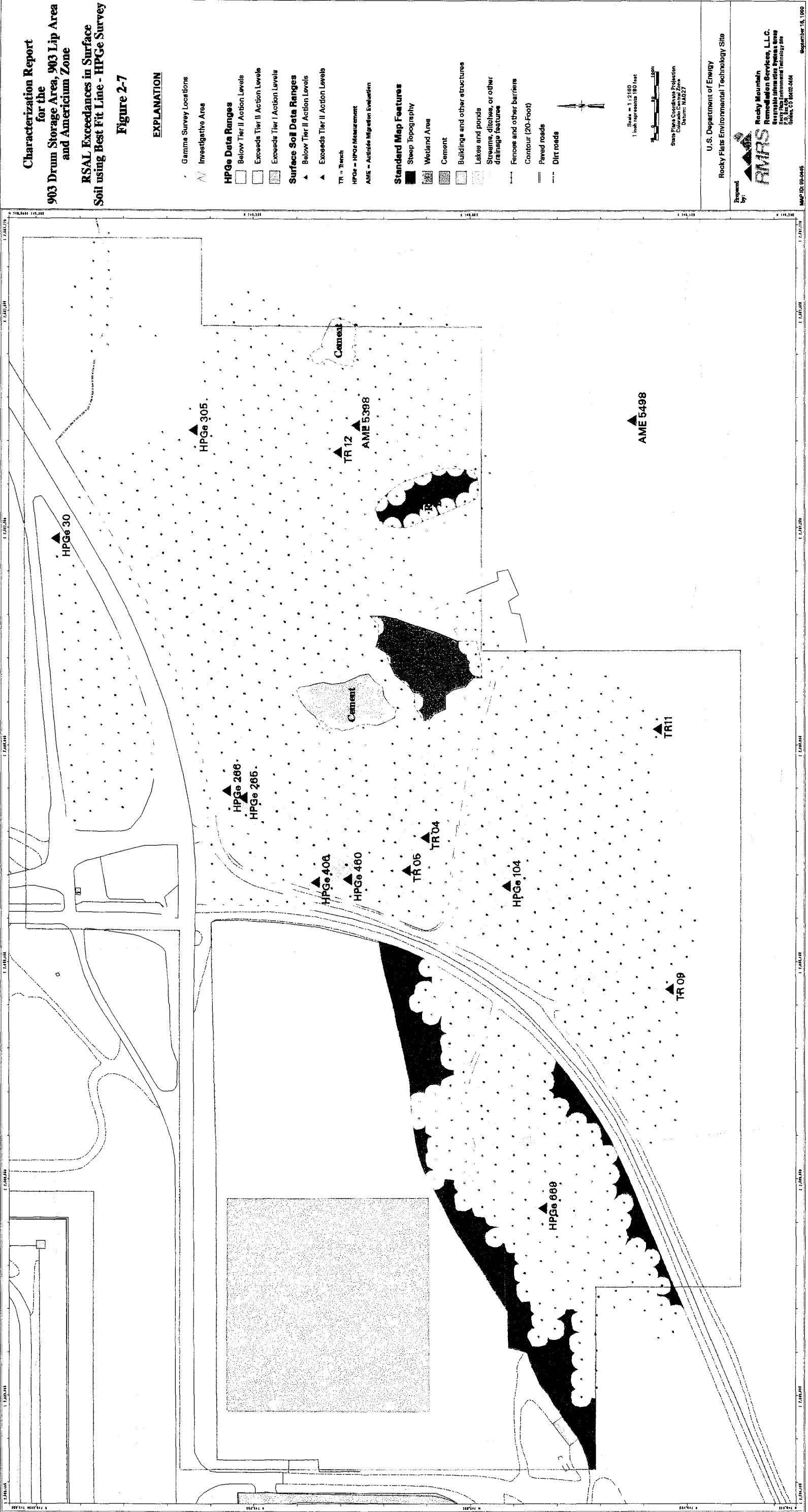
U.S. Department of Energy  
Rocky Flats Environmental Technology Site



**Rocky Mountain  
Remediation Services, LLC**  
Environmental Remediation Services  
Rocky Flats Environmental Technology Site  
Colorado, USA  
970.442.0144

MAP ID: 10-0446

September 15, 1999



NT 9/vw:/p/ro/eote/y9/9-0-45/te/\_beeffit-0-0.m



NT\_Srvr\w\proj\95-0446\fig\fig2-8.mxd





Characterization Report  
for the  
903 Drum Storage Area,  
903 Lip Area  
and Americium Zone

VOC Investigation  
Borehole Location Map

Figure 2-13

- EXPLANATION**
- ▲ VOC Boreholes, Original
  - ▽ VOC Boreholes, Stepout
  - Radiological Borehole where VOC Sample was Collected
  - Groundwater Well
- Standard Map Features**
- Buildings and other structures
  - Solar Evaporation Ponds (SEP)
  - Streams, ditches, or other drainage features
  - Fences and other barriers
  - Contour (5-Foot)
  - Paved roads
  - Dirt roads

**DATA SOURCES:**  
Buildings, fences, hydrography, roads and other structures from 1994 aerial photo data captured by ERM/RSI, Las Vegas, NV.  
Topographic contours were derived from digital elevation model (DEM) data by Mountain Remediation Services, LLC (MRS) and Rocky Mountain Remediation Services, LLC (RMRS).  
The DEM data was captured by the Nevada Sampling Lab, Las Vegas, NV, 1994. Aerial Photo is - 10 meter resolution.  
DEM data was processed by MRS, Western 1997.

**DISCLAIMER:**  
Neither the United States Government nor ERM/RSI, nor Rocky Mountain Remediation Services, LLC, nor any agency thereof, makes any warranty, expressed or implied, or assumes any legal liability for the accuracy, completeness, or usefulness of any information, advice, or product, or process disclosed, or represents that it would not infringe privately owned rights.

Scale = 1:830  
1 inch represents approximately 89 feet



State Plane Coordinate Projection  
Colorado Central Zone  
Datum: NAD27

U.S. Department of Energy  
Rocky Flats Environmental Technology Site

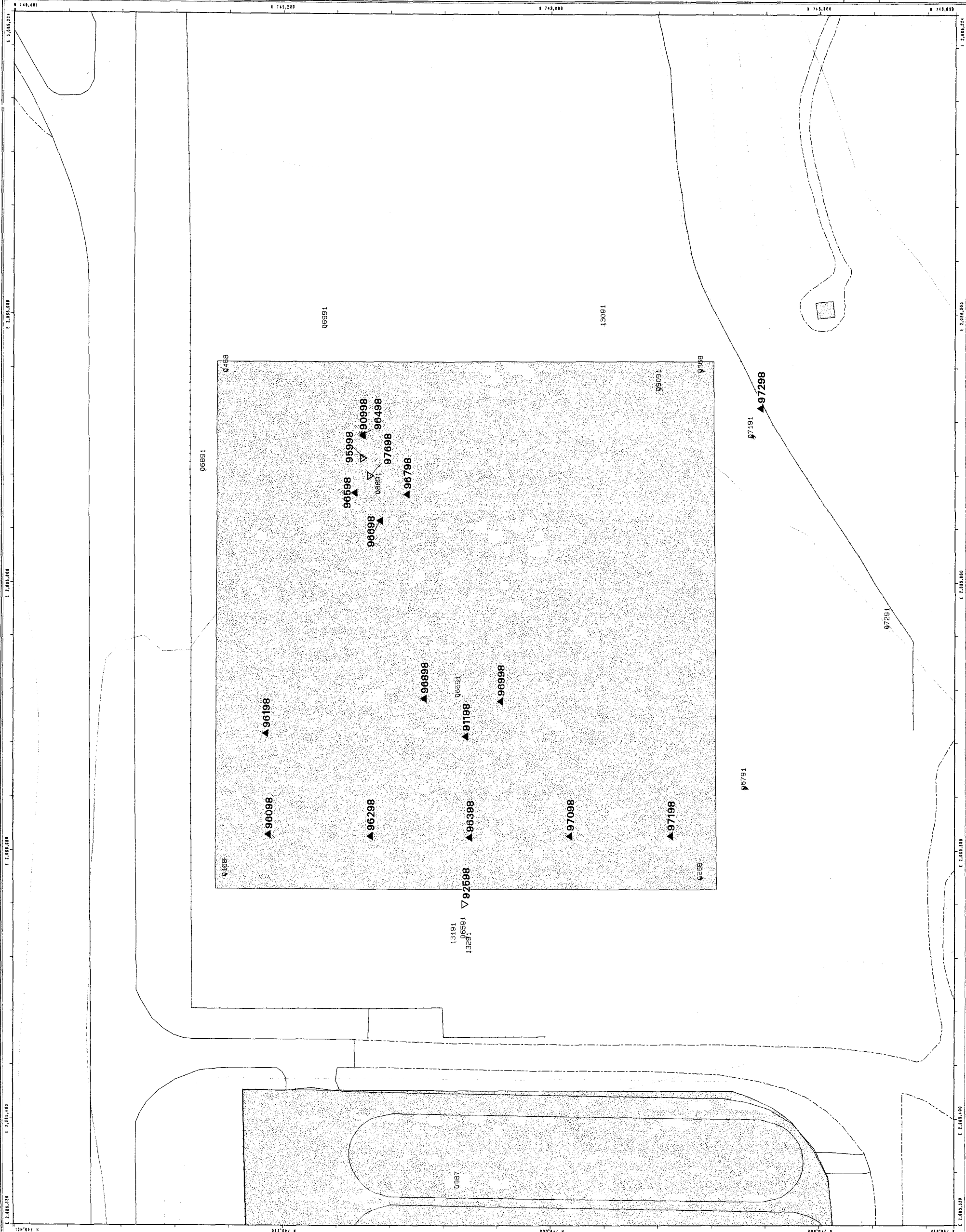
Prepared by:



Rocky Mountain  
Remediation Services, LLC  
Geographic Information Systems Group  
Rocky Flats Environmental Technology Site  
P.O. Box 46000  
Golden, CO 80602-0464

MAP ID: 95-0408

September 16, 1999





# Characterization Report for the 903 Drum Storage Area, 903 Lip Area and Americium Zone

## Distribution of Am-241 in Surface Soil - HPGe Survey

Figure 4-3

- EXPLANATION**
- Am-241 Levels and Isotach Contour  
(Contour Interval = 10 pCi/g)
  - Extent of RFCA Tier I Exceedances  
(215 pCi/g)
  - Extent of RFCA Tier II Exceedances  
(38 pCi/g)
  - Investigation Area

### Standard Map Features

- Buildings and other structures
- Fences and other barriers
- Contour (20-Foot)
- Paved roads
- Dirt roads

**DATA SOURCES:**  
Aerial photographs, topographic maps, and other  
information were used to develop the map.  
Topographic contours were derived from digital elevation model  
data provided by the U.S. Geological Survey. The data were  
processed by the U.S. Geological Survey to produce the  
contours shown on this map. The data were collected by the  
U.S. Geological Survey in 1987. The data were processed by  
the U.S. Geological Survey in 1987. The data were processed by  
the U.S. Geological Survey in 1987.

**Legend:**  
The legend is located in the upper right corner of the map.  
It contains symbols for buildings, fences, contours, paved roads,  
and dirt roads. The legend is used to identify the features  
shown on the map. The legend is used to identify the features  
shown on the map. The legend is used to identify the features  
shown on the map.

Scale = 1 : 2410  
1 inch represents approximately 201 feet

State Plane Coordinate Projection  
Contour Interval = 10 pCi/g  
Datum: NAD27

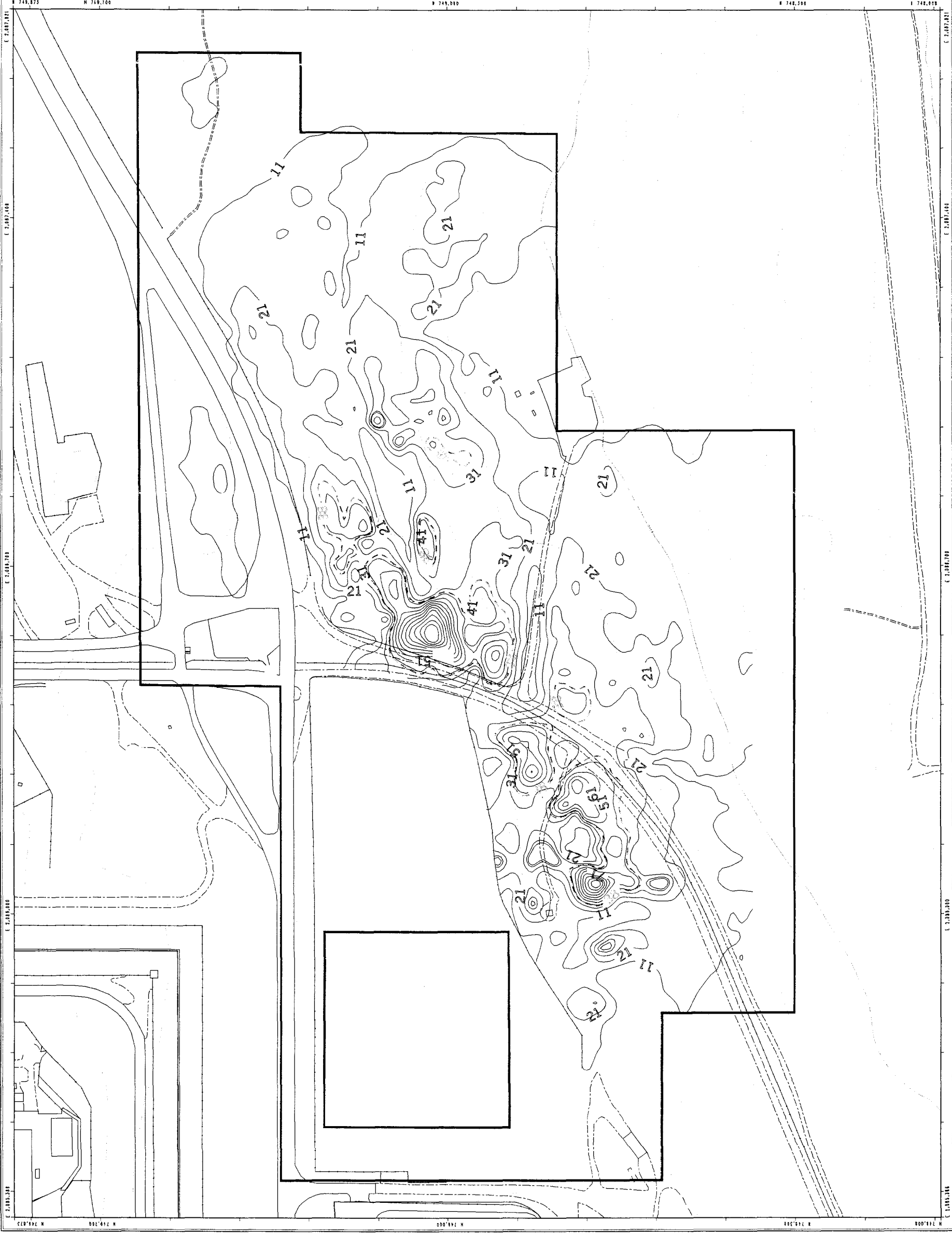
U.S. Department of Energy  
Rocky Flats Environmental Technology Site



Rocky Mountain  
Remediation Services, LLC  
Geographic Information Systems Group  
Golden, CO 80402-464

MAP ID: 99-0408

September 15, 1999



Characterization Report  
for the  
903 Drum Storage Area, 903 Lip Area  
and Americium Zone

Distribution of Pu-239/240 in  
Surface Soil - HPGe Survey

Figure 4-4

- EXPLANATION**
- Pu-239/240 Levels and Isoactivity Contour  
(Contour Interval = 100 pCi/g)
  - Extent of RFCA Tier I Exceedances  
(1428 pCi/g)
  - Extent of RFCA Tier II Exceedances  
(252 pCi/g)
  - Investigation Area
- Standard Map Features**
- Buildings and other structures
  - Fences and other barriers
  - Contour (20-Foot)
  - Paved roads
  - Dirt roads

**DATA SOURCE:**  
Buildings, fences, hydrography, roads and other  
features were obtained from the 1994  
aerial photograph. The data were  
verified by ES&S, Inc. in 1994.  
The data were obtained from the 1994  
aerial photograph. The data were  
verified by ES&S, Inc. in 1994.  
The data were obtained from the 1994  
aerial photograph. The data were  
verified by ES&S, Inc. in 1994.

**DISCLAIMER:**  
The data were obtained from the 1994  
aerial photograph. The data were  
verified by ES&S, Inc. in 1994.  
The data were obtained from the 1994  
aerial photograph. The data were  
verified by ES&S, Inc. in 1994.  
The data were obtained from the 1994  
aerial photograph. The data were  
verified by ES&S, Inc. in 1994.

Scale = 1 : 2410  
1 inch represents approximately 201 feet



State Plane Coordinate Projection  
Colorado Central Zone  
Datum: NAD27

U.S. Department of Energy  
Rocky Flats Environmental Technology Site



Rocky Mountain  
Remediation Services, LLC  
Remediation Services, LLC  
Rocky Flats Environmental Technology Site  
P.O. Box 254  
Golden, CO 80602-0254

MAP ID: 95-0408

September 16, 1999





Characterization Report  
for the

903 Drum Storage Area, 903 Lip Area  
and Americium Zone

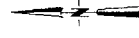
Distribution of Am-241 in  
Native 1 Soil Horizon

Figure 4-7

- EXPLANATION**
- Am-241 Levels and Isoactivity Contour  
(Contour Interval = 2000 pCi/g)
  - Extent of RFCA Tier I Exceedances  
(215 pCi/g)
  - Extent of RFCA Tier II Exceedances  
(38 pCi/g)
  - Investigation Area
  - Borehole Locations
- Standard Map Features**
- Buildings and other structures
  - Fences and other barriers
  - Contour (20-Foot)
  - Paved roads
  - Dirt roads

**DATA SOURCE:**  
Buildings, fences, hydrography, roads and other  
features were obtained from the 1995  
aerial photograph and the 1995  
topographic map of the site.  
The 1995 aerial photograph was  
digitized from the orthorectified 1995  
aerial photograph using ESRI Arc/Info and  
the 1995 topographic map was digitized  
from the 1995 topographic map using  
ESRI Arc/Info. The 1995 aerial photograph  
was obtained from the U.S. Geological  
Survey, Denver, Colorado. The 1995  
topographic map was obtained from the  
U.S. Geological Survey, Denver, Colorado.  
The 1995 aerial photograph was  
processed by the U.S. Geological  
Survey, Denver, Colorado, and the  
1995 topographic map was processed  
by the U.S. Geological Survey, Denver,  
Colorado.

**NOTES:**  
The 1995 aerial photograph was  
processed by the U.S. Geological  
Survey, Denver, Colorado, and the  
1995 topographic map was processed  
by the U.S. Geological Survey, Denver,  
Colorado. The 1995 aerial photograph  
was obtained from the U.S. Geological  
Survey, Denver, Colorado. The 1995  
topographic map was obtained from the  
U.S. Geological Survey, Denver, Colorado.  
The 1995 aerial photograph was  
processed by the U.S. Geological  
Survey, Denver, Colorado, and the  
1995 topographic map was processed  
by the U.S. Geological Survey, Denver,  
Colorado.



Scale = 1 : 1080  
1 inch represents 90 feet



State Plane Coordinate Projection  
Colorado Central Zone  
Datum: NAD27

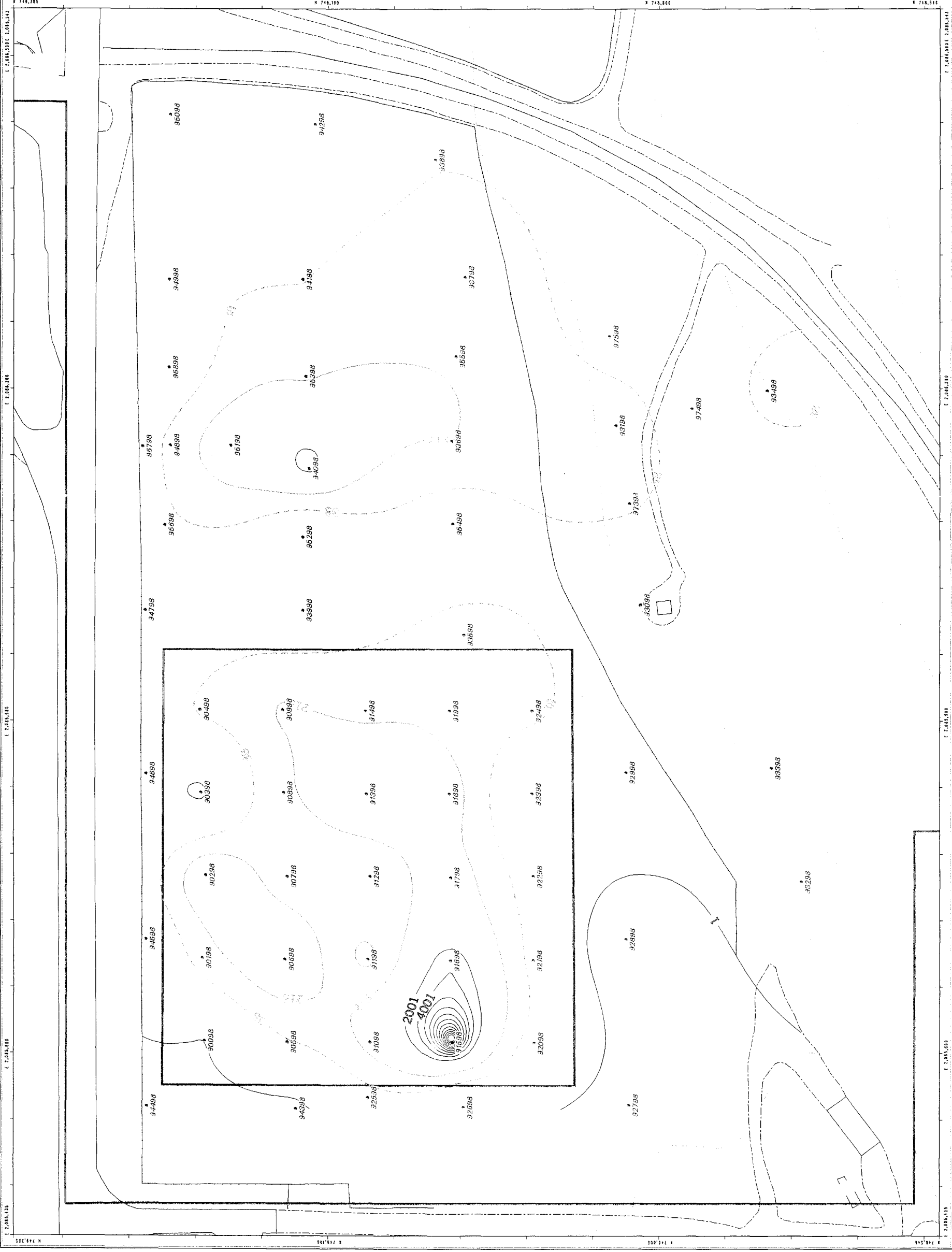
U.S. Department of Energy  
Rocky Flats Environmental Technology Site



Rocky Mountain  
Remediation Services, LLC.  
Geographic Information Systems Group  
Rocky Flats Environmental Technology Site  
Golden, CO 80402-4484

MAP ID: 99-0408

September 15, 1999



# Characterization Report for the 903 Drum Storage Area, 903 Lip Area and Americium Zone

### Distribution of Pu-239/240 in Native 1 Soil Horizon

### Figure 4-8

### EXPLANATION

**W Pu-239/240 Levels and Isoactivity Contour  
(Contour Interval = 10,000 pCi/g)**

**Extent of RFCA Tier I Exceedances  
(1429 pCi/g)**

**Extent of RFCA Tier II Exceedances  
(252 pCi/g)**

Investigation Area

### Borehole Locations

## Standard Map Features

☐ Buildings and other structures

### Fences and other barriers

### Contour (20-Foot)

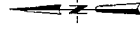
Paved roads

Dirt roads

**DATA SOURCE:**  
 Ruffalo Cancer Institutes made and other

structure from 1954 aerial fly-over data captured by EG&G RSL, Las Vegas. Digitized from the orthophotographs, 1995 topography (contours) were derived from digital elevation model (DEM) data by Morrison Knudsen (MK) using ESRI Arc TIN and LATICE to process the DEM data to create 5-foot contours. The DEM data was captured by the Remote Sensing Lab, Las Vegas, NV, 1954 Aerial Flyover at ~ 10 meter resolution. DEM post-processing performed by MKC, Winter 1997.

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Scale = 1 : 1080  
1 inch represents 90 feet

Scale = 1:1080  
1 inch represents 90 feet



State Plane Coordinate Projection  
Colorado Central Zone  
Datum: NAD27

U.S. Department of Energy  
Rocky Flats Environmental Technology Site

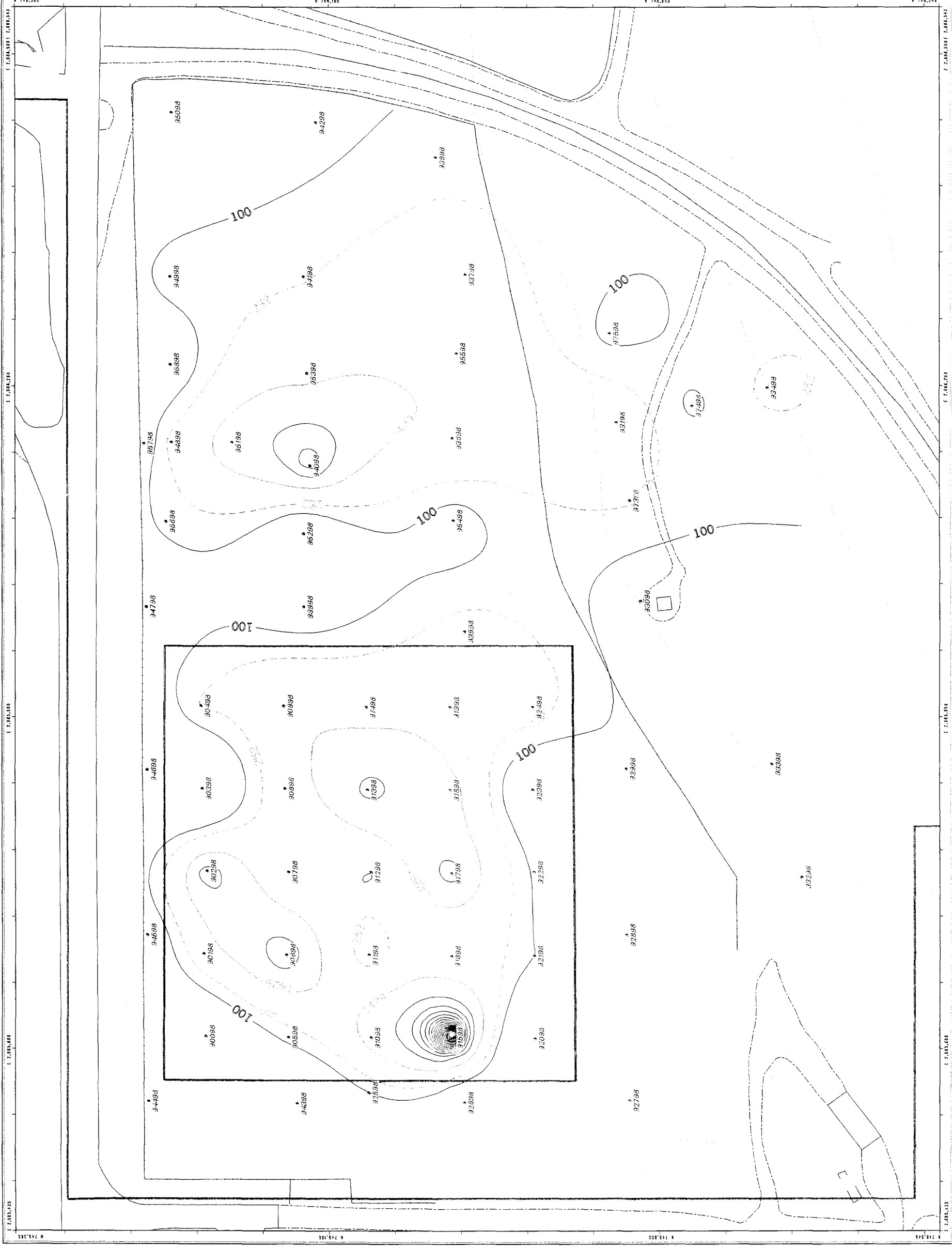
Prepared by:



**Rocky Mountain  
Remediation Services, L.L.C.**  
**Geographic Information Systems Group**  
Rocky Flats Environmental Technology Site  
P.O. Box 464  
Golden, CO 80402-0464

MAP ID: 98-0408

September 15, 1999









Characterization Report  
for the

903 Drum Storage Area, 903 Lip Area  
and Americium Zone

Distribution of Am-241 in  
Native 2 Soil Horizon

Figure 4-10

EXPLANATION

Am-241 Levels and Isoactivity Contour  
(Contour Interval = 20 pCi/g)

Extent of RFCA Tier I Exceedances  
(215 pCi/g)

Extent of RFCA Tier II Exceedances  
(38 pCi/g)

Investigation Area

Borehole Locations

Standard Map Features

Buildings and other structures

Fences and other barriers

Contour (20-Foot)

Paved roads

Dirt roads

DATA SOURCE:

Am-241 data were geographically coded and other  
information from 1994 aerial photo data  
provided by EG&G AEC, Las Vegas.  
Topography (contours) were derived from digital elevation model  
(DEM) data by Mission Resources (MR) using ESRI Arc 7M and  
USGS data. The data were captured by the Remote Sensing Lab, Los  
Alamos National Laboratory, and the data were processed by  
MR. The data were processed by MR, March 1997.

Am-241 data were geographically coded and other  
information from 1994 aerial photo data  
provided by EG&G AEC, Las Vegas.  
Topography (contours) were derived from digital elevation model  
(DEM) data by Mission Resources (MR) using ESRI Arc 7M and  
USGS data. The data were captured by the Remote Sensing Lab, Los  
Alamos National Laboratory, and the data were processed by  
MR. The data were processed by MR, March 1997.

Scale = 1 : 10880  
1 inch represents 30 feet

State Plane Coordinates Projection  
Contour Interval = 20 Feet  
Datum: NAD27

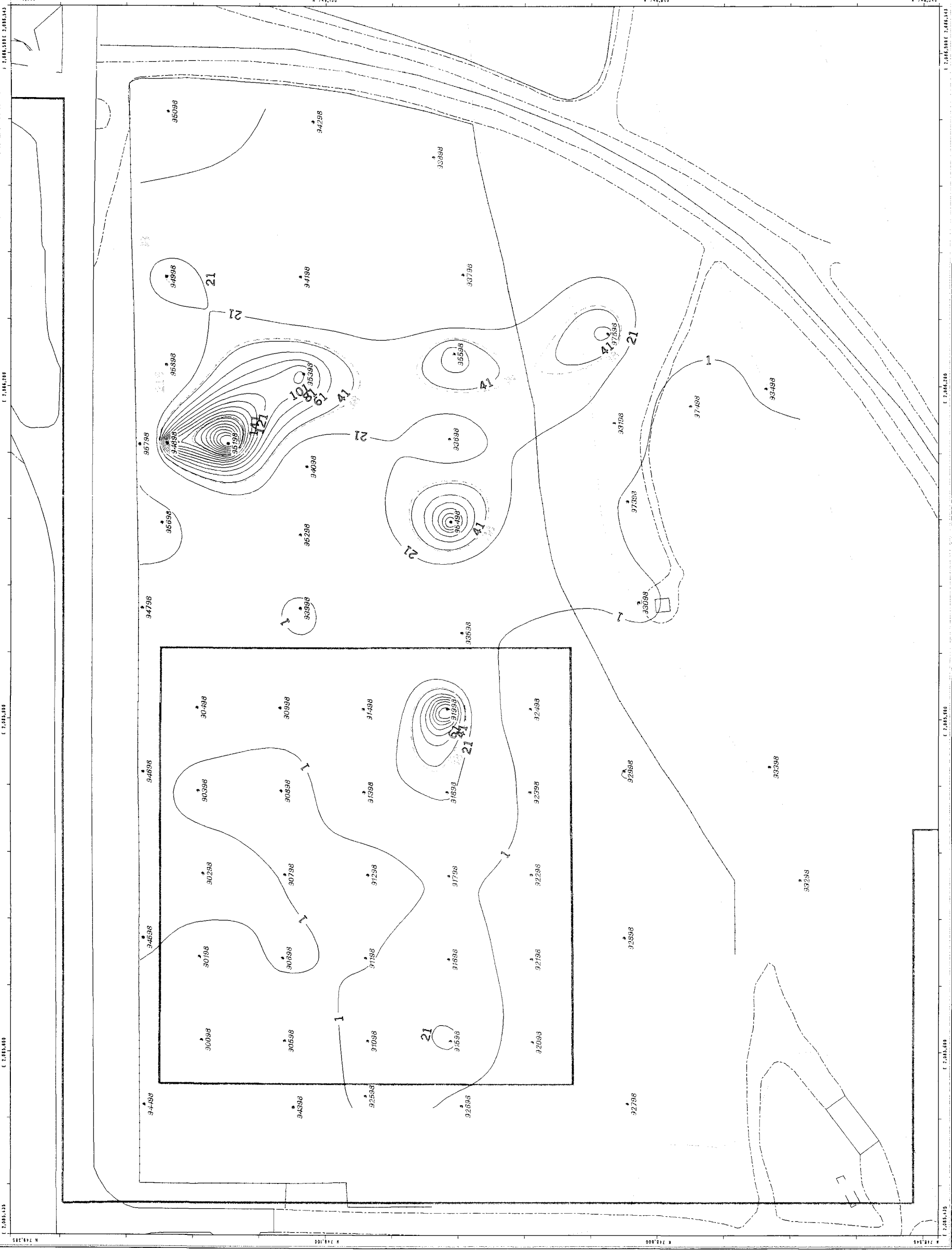
U.S. Department of Energy  
Rocky Flats Environmental Technology Site



Rocky Mountain  
Remediation Services, LLC.  
Geographic Information Systems Group  
P.O. Box 48  
Golden, CO 80402-0048

MAP ID: 99-0408

September 15, 1999



Characterization Report  
for the  
903 Drum Storage Area, 903 Lip Area  
and Americium Zone

Distribution of Pu-239/240 in  
Native 2 Soil Horizon

Figure 4-11

EXPLANATION

~ Pu-239/240 Levels and Isoactivity Contour  
(Contour Interval = 100 pCi/g)

~ Extent of RFCA Tier I Exceedances  
(1429 pCi/g)

~ Extent of RFCA Tier II Exceedances  
(252 pCi/g)

~ Investigation Area

• Borehole Locations

Standard Map Features

□ Buildings and other structures

--- Fences and other barriers

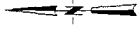
--- Contour (20-Foot)

== Paved roads

--- Dirt roads

DATA SOURCE  
The data for this map were derived from the results of the  
soil sampling and analysis performed by the U.S. Environmental  
Protection Agency (EPA) and the U.S. Department of Energy  
(DOE) under the terms of the Remedial Investigation and  
Feasibility Study (RI/FS) for the 903 Drum Storage Area, 903  
Lip Area, and Americium Zone. The data were processed by  
the Rocky Mountain Remediation Services, LLC (RMS) using  
the ArcView software. The map was prepared by RMS on  
September 15, 1999.

NOTES  
1. The map shows the distribution of Pu-239/240 in the  
Native 2 soil horizon. The contours represent the  
isoactivity levels. The shaded areas represent the  
extent of RFCA Tier I and Tier II exceedances.  
2. The map was prepared using the data provided by  
the U.S. Environmental Protection Agency (EPA) and  
the U.S. Department of Energy (DOE). The data  
were processed by the Rocky Mountain  
Remediation Services, LLC (RMS) using the  
ArcView software.



Scale = 1:1080  
1 inch represents 90 feet



State Plane Coordinate Projection  
Colorado Central Zone  
Datum: NAD27

U.S. Department of Energy  
Rocky Flats Environmental Technology Site

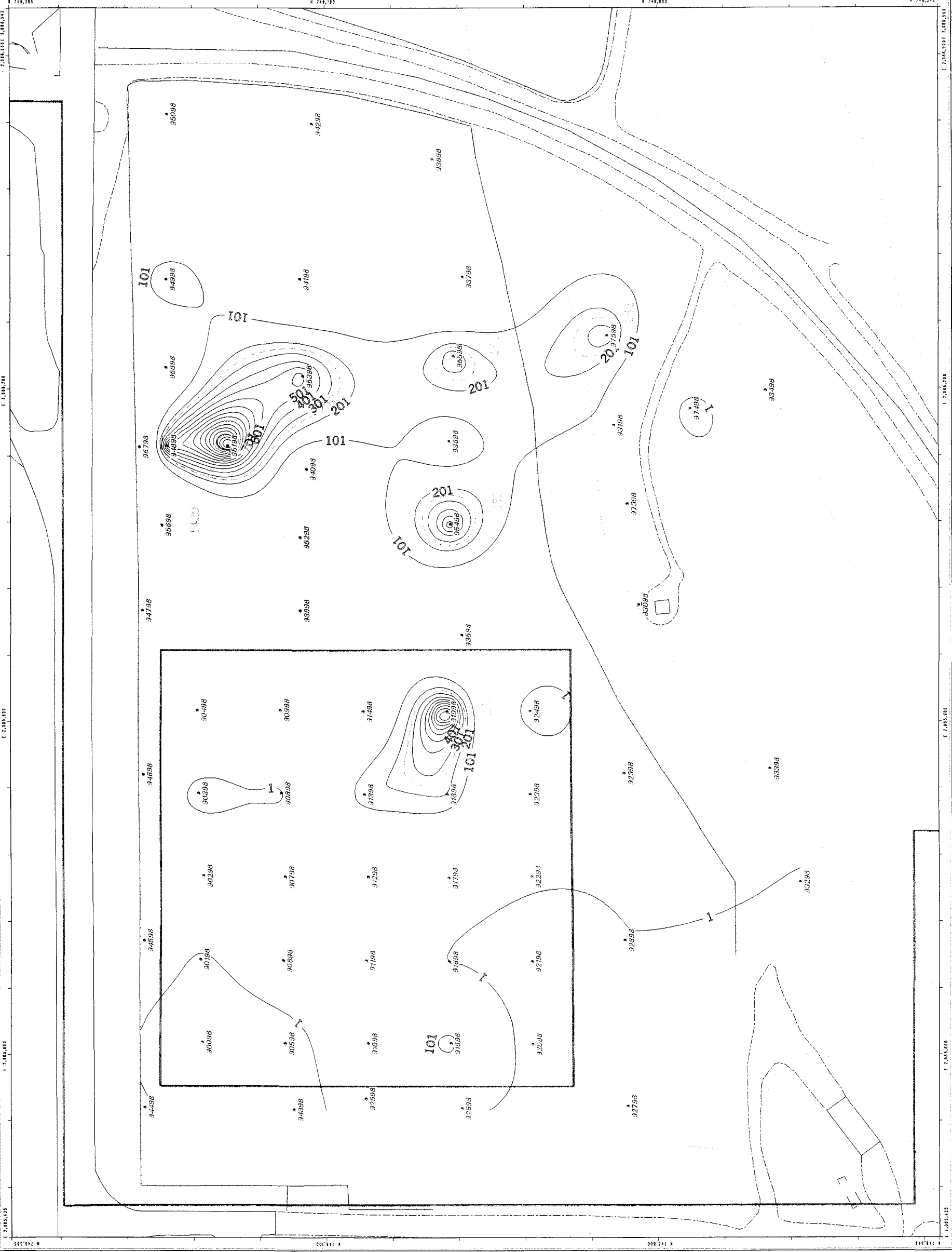
Prepared by:



Rocky Mountain  
Remediation Services, LLC  
Geographic Information Systems Group  
Rocky Flats Environmental Technology Site  
P.O. Box 484  
Golden, CO 80402-0484

MAP ID: 99-0409

September 15, 1999





1001

Characterization Report  
for the  
903 Drum Storage Area, 903 Lip Area  
and Americium Zone

Distribution of Pu-239/240 in  
Native 3 Soil Horizon

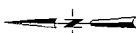
Figure 4-14

EXPLANATION

- Pu-239/240 Levels and Isoactivity Contour  
(Contour Interval = 20 pCi/g)
- Extent of RFCA Tier I Exceedances  
(1429 pCi/g)
- Extent of RFCA Tier II Exceedances  
(252 pCi/g)
- Investigation Area
- Borehole Locations
- Standard Map Features
  - Buildings and other structures
  - Fences and other barriers
  - Contour (20-Foot)
  - Paved roads
  - Dirt roads

DATA SOURCE:  
The data for this map were obtained from the  
investigation area, which was defined by the  
RFCA Tier I and II Exceedances. The data were  
collected by the Rocky Mountain Remediation  
Services, LLC, in 1998. The data were used to  
create the map. The map was created by the  
Rocky Mountain Remediation Services, LLC, in  
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in 1998. The map was created by the Rocky  
Mountain Remediation Services, LLC, in 1998.

Rocky Mountain Remediation Services, LLC  
10000 E. 1st Avenue, Suite 100  
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Email: info@rmrs.com  
Website: www.rmrs.com



Scale = 1 : 1000  
1 inch represents 90 feet



State Plane Coordinate Projection  
Colorado Central Zone  
Datum: NAD27

U.S. Department of Energy  
Rocky Flats Environmental Technology Site

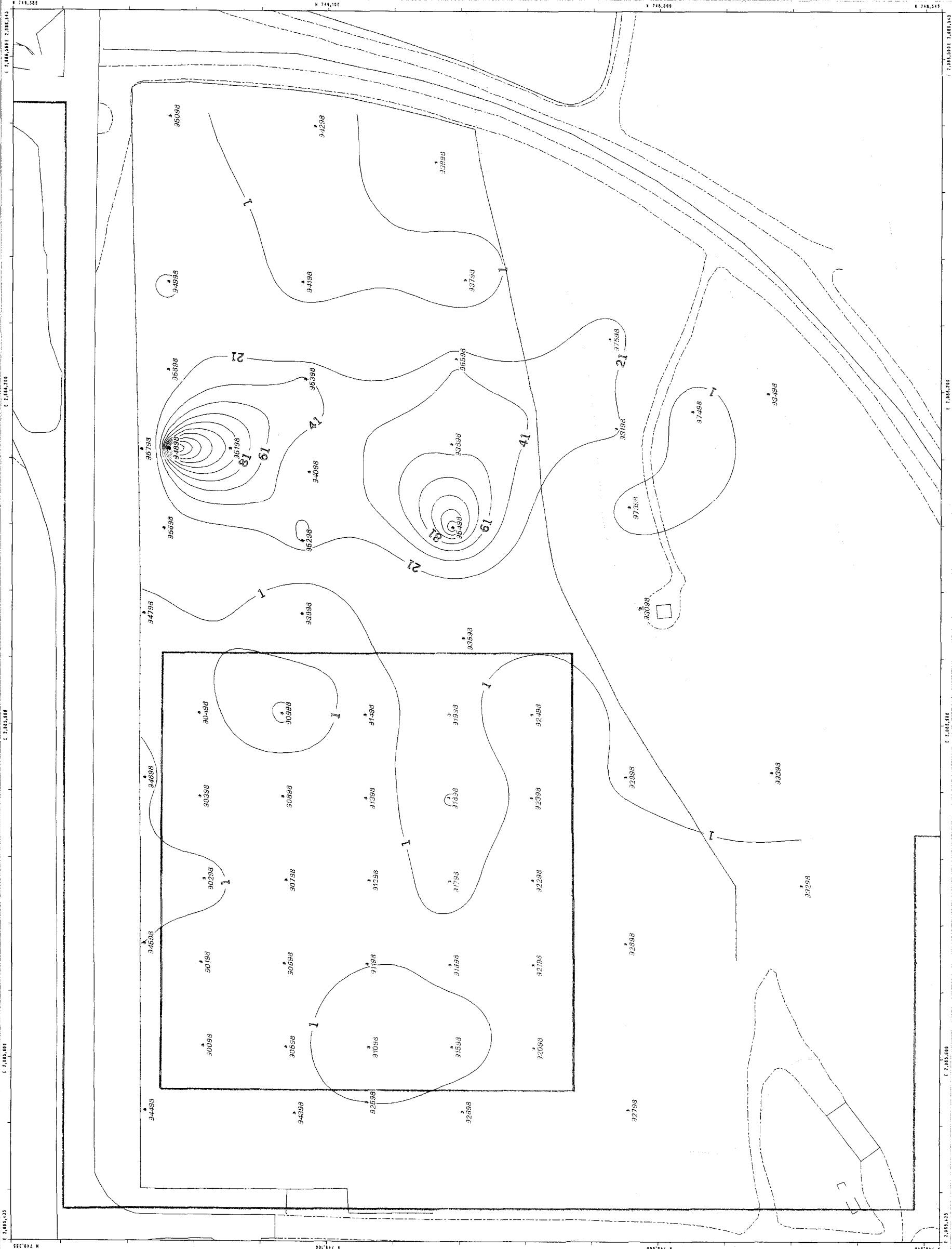


Rocky Mountain  
Remediation Services, LLC  
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Fax: (303) 755-1001  
Email: info@rmrs.com  
Website: www.rmrs.com

MAP ID: 98-0408

September 15, 1999

NT 89w:/projects/98-0408/pu\_n3.aml



Characterization Report  
for the  
903 Drum Storage Area, 903 Lip Area  
and Americium Zone

Radionuclide Distribution  
in Asphalt

Figure 4-15

EXPLANATION

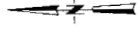
Boreholes locations

- Location
- Sample Depth (ft.)
- AM241 (pCi/g)
- Pu239/240 (pCi/g)
- U233/234 (pCi/g)
- U235 (pCi/g)
- U238 (pCi/g)

Standard Map Features

- Buildings and other structures
- Lakes and ponds
- Streams, ditches, or other drainage features
- Fences and other barriers
- Contour (5-Foot)
- Paved roads
- Dirt roads

DATA SOURCES:  
Soil data, geology, hydrology, and other information were obtained from the 1997 Remedial Investigation Report (RIR) for the 903 Drum Storage Area, 903 Lip Area, and Americium Zone. The RIR was prepared by the Rocky Mountain Remediation Services, LLC. The RIR data were used to develop the map. The map was prepared by the Rocky Mountain Remediation Services, LLC. The map was prepared by the Rocky Mountain Remediation Services, LLC. The map was prepared by the Rocky Mountain Remediation Services, LLC.



Scale = 1:700  
1 inch represents approximately 58 feet

15 0 30 60 ft

State Plane Coordinate Projection  
Colorado Central Zone  
Datum: NAD27

U.S. Department of Energy  
Rocky Flats Environmental Technology Site

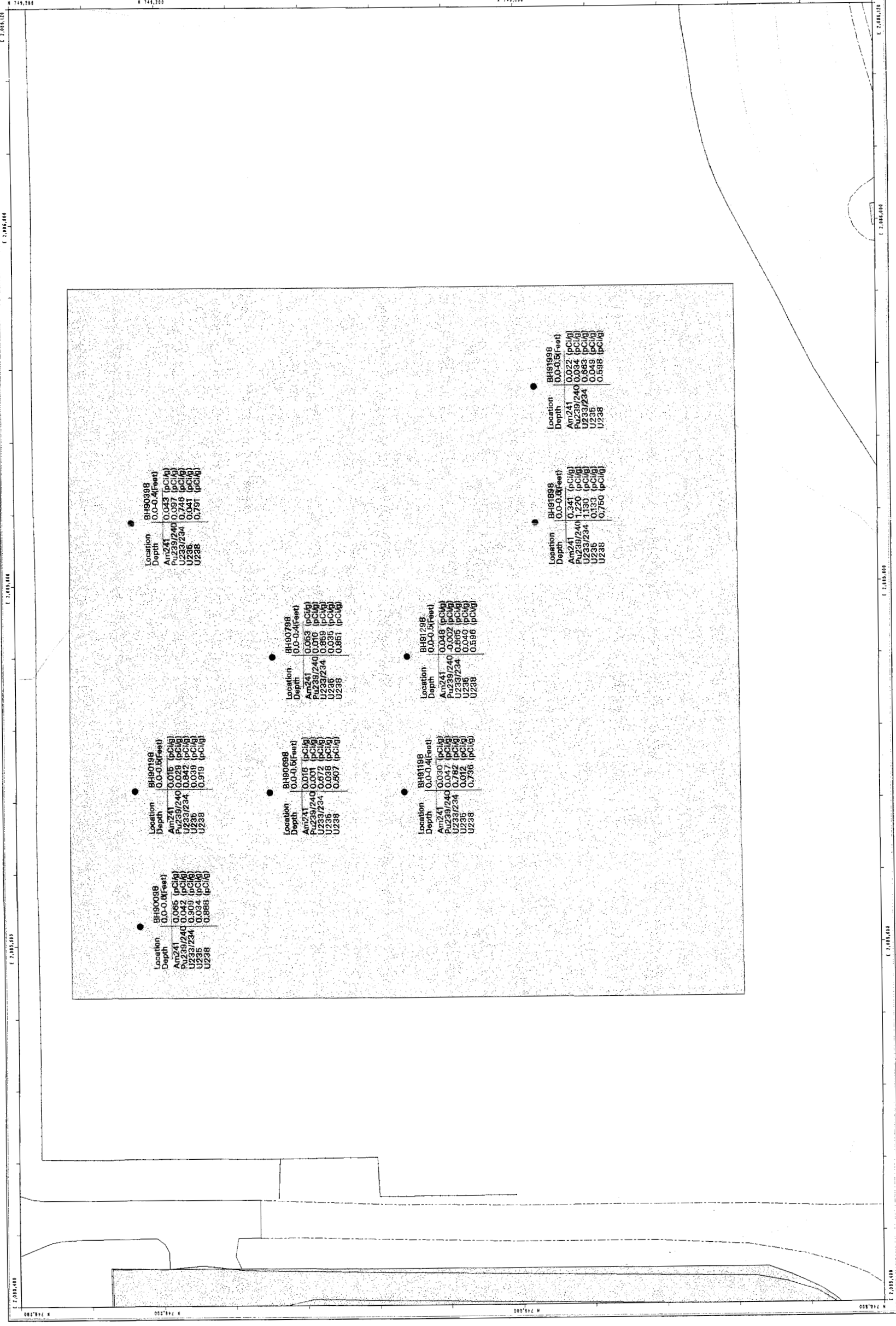
Prepared by:



Rocky Mountain  
Remediation Services, LLC  
Geographic Information Systems Group  
Rocky Flats Environmental Technology Site  
Golden, CO 80624-0404

MAP ID: 98-009

September 15, 1999







# Characterization Report for the 903 Drum Storage Area, 903 Li and Americium Zone

## VOC Distribution in Soil

### Figure 4-18

### EXPLANATION







- ▲ VOC Boreholes, Original
- ▽ VOC Boreholes, Stepout
- Radiological Borehole where VOC Sample was Collected
- Borehole location
- Borehole PCE TCE CCL4 1,2-DCE
- Sample Depth Results in Feet
- VOC Compound Results in ug/kg
- VOC detections in blue
- Proposed Tier I Exceedance in red
- Proposed Tier II Exceedance in green
- Groundwater Well

**NOTE:**

PCE = Tetrachloroethene  
TCE = Trichloroethene  
CCL4 = Carbon Tetrachloride  
1,2-DCE = 1,2-Cis-Dichloroethylene

U = Undetected, Contract Required  
Quantitative Limit  
J = Associated Value is an  
Estimated Quantity  
D = Dilution

## Standard Map Features

- |   |   |
|---|---|
|  | <b>Buildings and other structures</b>               |
|  | <b>Streams, ditches, or other drainage features</b> |
|  | <b>Fences and other barriers</b>                    |
|  | <b>Contour (5-Foot)</b>                             |
|  | <b>Paved roads</b>                                  |
|  | <b>Dirt roads</b>                                   |

1000

[illegible]

Scale = 1 : 830

1 inch represents approximately 69 feet



State Plane Coordinate Projection  
Colorado Central Zone  
Datum: NAD27

U.S. Department of Energy  
Rocky Flats Environmental Technology Site

Prepared by:



**Rocky Mountain  
Remediation Services, L.L.C.**  
Geographic Information Systems Group  
Rocky Flats Environmental Technology Site  
P.O. Box 484  
Golden, CO 80402-0464

MAP ID: 99-0288

September 16, 1999



Characterization Report  
for the  
903 Drum Storage Area, 903 Lip Area  
and Americium Zone

Composite Map of  
Tier I RSAL Exceedances

Figure 5-1

EXPLANATION

Native 1 (0-6 inches)

Native 2 (6-12 inches)

Standard Map Features

Buildings and other structures

Lakes and ponds

Streams, ditches, or other  
drainage features

Fences and other barriers

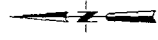
Contour (20-Foot)

Paved roads

Dirt roads

DATA SOURCE:  
Topographic data, hydrography, roads and other  
features were obtained from the 1994  
edition of the 7.5 minute topographic map  
of the area, which was digitized by the  
Rocky Mountain Remediation Services, LLC.  
The data was then processed by the  
Rocky Mountain Remediation Services, LLC.  
The data was then processed by the  
Rocky Mountain Remediation Services, LLC.  
The data was then processed by the  
Rocky Mountain Remediation Services, LLC.

Rocky Mountain Remediation Services, LLC  
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Fax: (303) 733-1112  
Email: info@rmrs.com  
Website: www.rmrs.com



Scale = 1 : 1250

1 inch represents approximately 108 feet



State Plane Coordinate Projection  
Colorado Central Zone  
Datum: NAD27

U.S. Department of Energy  
Rocky Flats Environmental Technology Site

Prepared  
by:



Rocky Mountain  
Remediation Services, LLC  
Remediation Services Group  
Rocky Flats Environmental Technology Site  
Golden, CO 80642-0464

MAP ID: 99-0408

September 18, 1999










## Composite Map of Tier II RSAL Exceedances

### Figure 5-2

EXPLANATION	
<input type="checkbox"/>	Native 1 (0-6 inches)
<input type="checkbox"/>	Native 2 (6-12 inches)
<input type="checkbox"/>	Native 3 (12-18 inches)

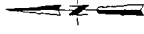
## Standard Map Features

- |   |   |
|---|---|
|  | <b>Buildings and other structures</b>               |
|  | <b>Lakes and ponds</b>                              |
|  | <b>Streams, ditches, or other drainage features</b> |
|  | <b>Fences and other barriers</b>                    |
|  | <b>Contour (20-Foot)</b>                            |
|  | <b>Paved roads</b>                                  |
|  | <b>Dirt roads</b>                                   |

**DATA SOURCE:** Radar altimetry, ocean hydrography, winds and other atmospheric data from 1994 aerial and in-situ data captured by ECAC RSL, Las Vegas. Digitized from the orthorectified topography 1/95 Topobase (contours) were derived from digital elevation model (DEM) data by Morrison Knudsen (MK) using ESRI Arc TIN and ArcView software. The DEM data were obtained by the Remote Sensing Laboratory, WPI, 1994. Aerial Flyover at ~40 meter resolution, DEM post-processing performed by MK, Winter 1997.

I have been thinking about you a lot lately and wondering how you are getting on. I hope you are well and happy. I have been busy with work and family, but I always find time to think of my friends. Please write back when you have a chance. I would love to hear from you.

Love,  
 John



Scale = 1 : 2390  
1 inch represents approximately 199 feet



State Plane Coordinate Projection  
Colorado Central Zone  
Datum: NAD27

U.S. Department of Energy  
Rocky Flats Environmental Technology Site

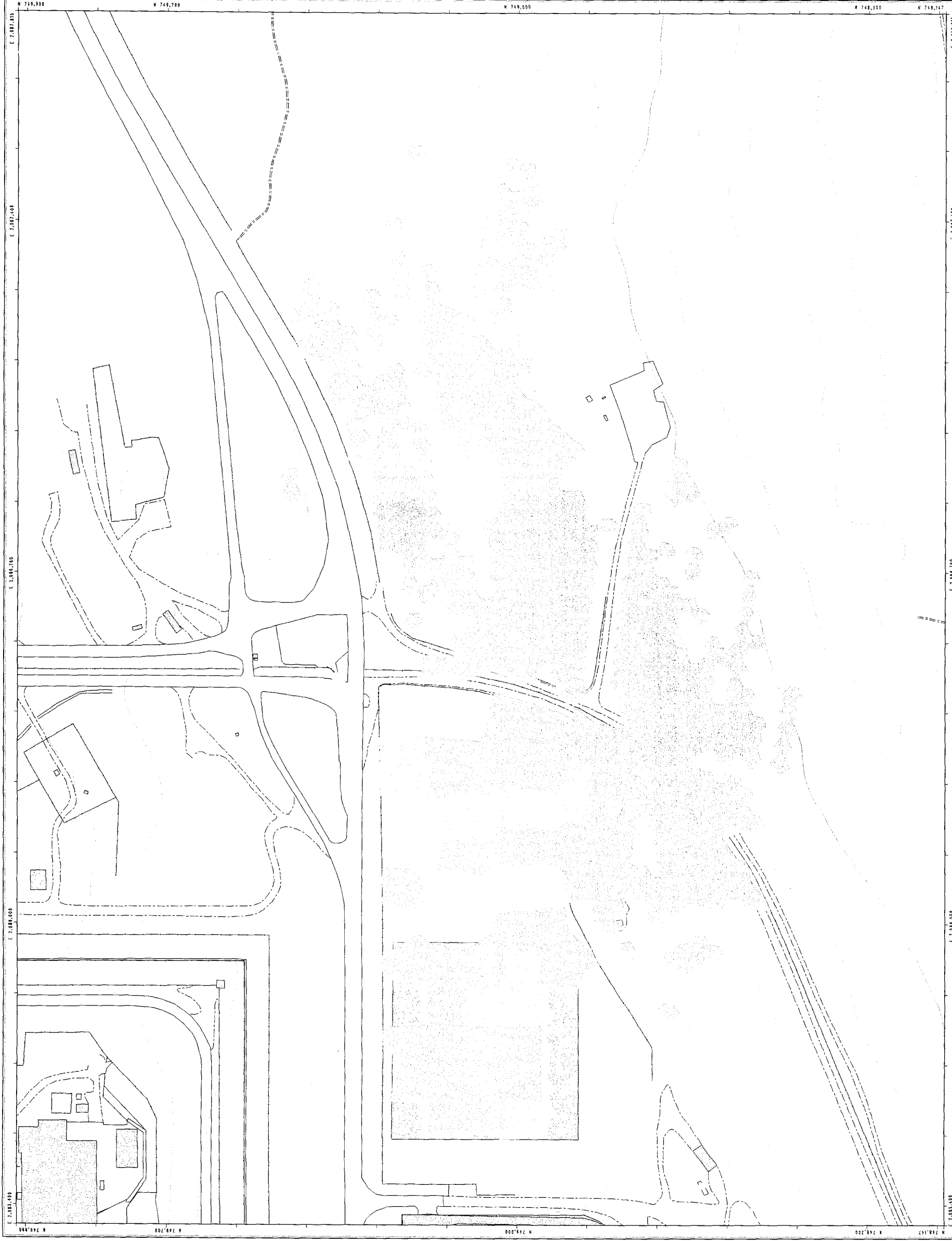
Prepared by:



**Rocky Mountain  
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Geographic Information Systems Group  
Rocky Flats Environmental Technology Site

MAP ID: 98-0408

September 16, 1999



Characterization Report  
for the  
903 Drum Storage Area, 903 Lip Area  
and Americium Zone

Composite Map of Proposed  
Tier I and Tier II  
SSAL Exceedences

Figure 5-3

- EXPLANATION**
- ▲ VOC Boreholes, Original
  - ▽ VOC Boreholes, Stepout
  - Radiological Borehole
  - Groundwater Well
  - Areal Extent of Proposed Tier I SSAL Exceedences
  - Areal Extent of Proposed Tier II SSAL Exceedences
- Standard Map Features**
- Buildings and other structures
  - Streams, ditches, or other drainage features
  - Fences and other barriers
  - Contour (5-Foot)
  - Paved roads
  - Dirt roads

NOTES:  
1. This map was prepared using data from the 903 Drum Storage Area, 903 Lip Area, and Americium Zone. The data was collected during the 1994-1995 period. The data is current as of the date of collection. The data is subject to change as more information is collected. The data is not intended to be used for any purpose other than the characterization of the site.

Scale = 1 : 830  
1 inch represents approximately 69 feet



State Plane Coordinate Projection  
Colorado Central Zone  
Datum: NAD27

U.S. Department of Energy  
Rocky Flats Environmental Technology Site

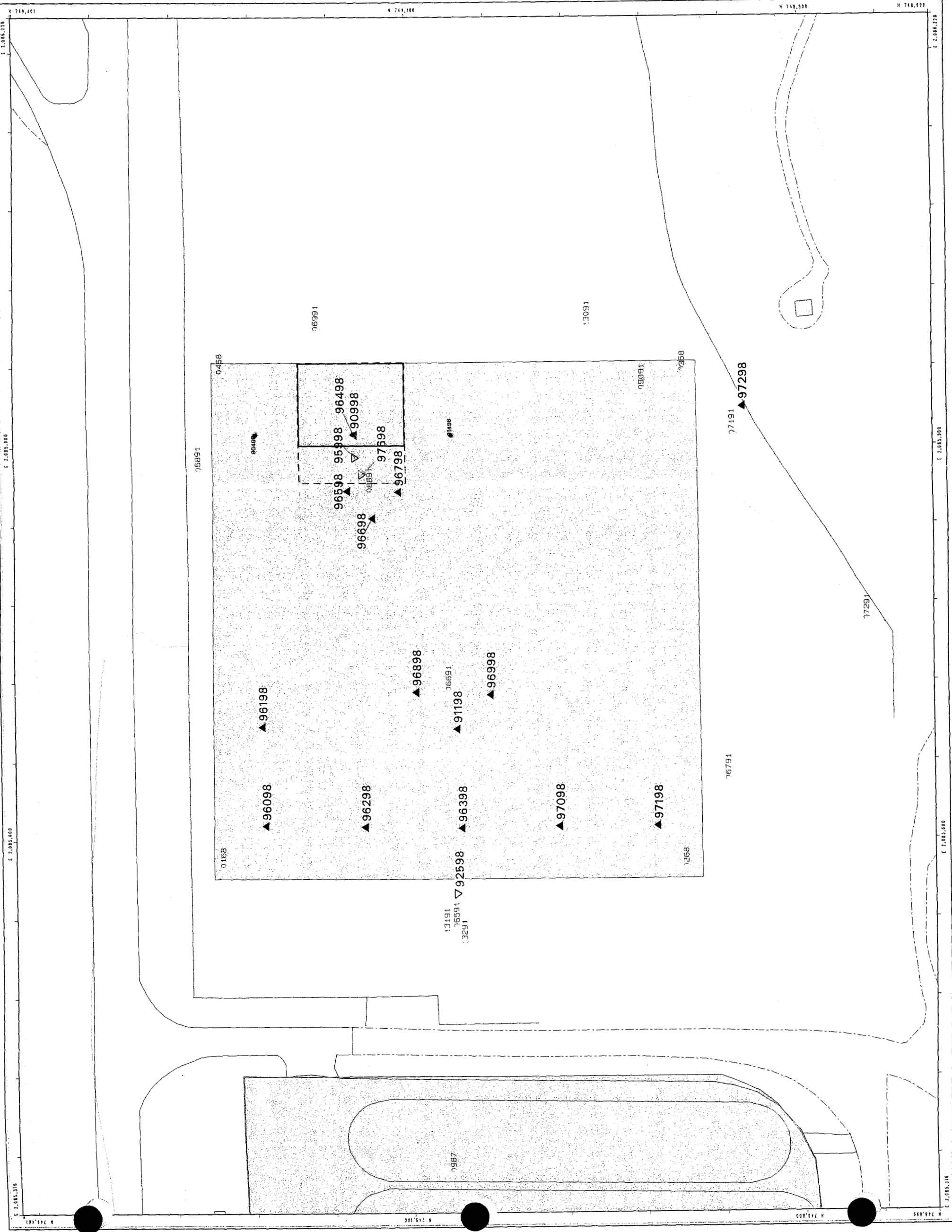
Prepared by:



Rocky Mountain  
Remediation Services, LLC  
Geographic Information Systems Group  
1400 West 10th Avenue  
P.O. Box 444  
Golden, CO 80402-0444

MAP ID: 99-0288

September 24, 1999





Characterization Report  
for the  
903 Drum Storage Area, 903 Lip Area  
and Americium Zone  
  
HPGe Measurement Location Map

Figure 2-1

EXPLANATION

Investigation Area

FOV (Field of View)  
Stake Number

Standard Map Features

Steep Topography

Wetland Area

Cement

Buildings and other structures

Lakes and ponds

Streams, ditches, or other  
drainage features

Fences and other barriers

Contour (20-Foot)

Paved roads

Dirt roads

DATA SOURCE:  
Buildings, fences, hydrography, roads and other  
features were digitized from aerial photography  
acquired by EG&G RSL Las Vegas.  
Topography (contours) were derived from a digital elevation model  
generated by the U.S. Army Corps of Engineers (USACE) using ESRI Arc 7M and  
LANTAS to process the DEM data to create 5-foot contours.  
The DEM data was captured by the Remote Sensing Lab, Las  
Vegas, NV, JASR and the National Center for Earth-Space  
Data Processing performed by MK, Winter 1997.

Rocky Mountain  
Remediation Services, L.L.C.  
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Scale = 1 : 1240  
1 inch represents approximately 103 feet



State Plane Coordinate Projection  
Colorado Central Zone  
Datum: NAD27

U.S. Department of Energy  
Rocky Flats Environmental Technology Site

Prepared  
by:



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MAP ID: 99-0408

September 24, 1999

